

Quantum Monte Carlo in the Apuan Alps VI

International Workshop
Saturday 24th - Saturday 31st July 2010
The Apuan Alps Centre for Physics @ TTI, Vallico Sotto, Tuscany

www.vallico.net/tti/tti.html

This is the programme document for the 2010 international workshop *Quantum Monte Carlo in the Apuan Alps* - the sixth such event to be held on this topic at TTI. The general purpose of workshops at this venue is to gather together a limited number of expert physicists to discuss subjects where the need for new insights is felt with particular intensity. The quantum Monte Carlo method, for many years the next big thing in computational electronic structure theory, is a good example of this.

The format of TTI workshops is intended to encourage a relaxed and intellectually-stimulating atmosphere rather different to the usual 8am to 7pm grind of your regular conference. Formal talks are restricted to the mornings, and participants are given the freedom and space to think and to contemplate and discuss the issues at hand. Healthy recreational activities are to be organized in the afternoons, and it is hoped that by taking part in these whilst breathing clean mountain air and sampling decent local food, the participant will be able to return home mentally and physically refreshed as well as having deepened their understanding of science.

1 LIST OF REGISTERED PARTICIPANTS

Dario Alfè	UCL, London, U.K.	d.alfè at ucl.ac.uk
Claudio Amovilli	University of Pisa, Italy	amovilli at dcci.unipi.it
Michal Bajdich	Oak Ridge National Laboratory, U.S.A.	bajdichm at ornl.gov
Dario Bressanini	Università dell'Insubria, Italy	dario.bressanini at uninsubria.it
Michele Casula	Ecole Polytechnique, Paris, France	casula at cpht.polytechnique.fr
Hai-Ping Cheng	University of Florida, U.S.A.	cheng at qtp.ufl.edu
Neil Drummond	Cambridge University, U.K.	ndd21 at cam.ac.uk
Elif Ertekin	MIT, U.S.A	elif1 at mit.edu
Franca Maria Floris	University of Pisa, Italy	floris at dcci.unipi.it
Matthew Foulkes	Imperial College, London, U.K.	wmc.foulkes at imperial.ac.uk
Rex Godby	University of York, U.K.	rwg3 at york.ac.uk
Richard Hennig	Cornell University, U.S.A.	rhennig at cornell.edu
Martin Korth	Cambridge University, U.K.	mkorth at muenster.de
Henry Krakauer	William and Mary College, U.S.A.	hxkrak at wm.edu
Jaron Krogel	University of Illinois, U.S.A.	jkrogel2 at illinois.edu
Martin Krupicka	Slovak Academy of Sciences, Bratislava	chemmakr at savba.sk
Robert Lee	Cambridge University, U.K.	rml38 at cam.ac.uk
Pablo Lopez Rios	Cambridge University, U.K.	pl275 at cam.ac.uk
Arne Lüchow	RWTH Aachen University, Germany	luechow at rwth-aachen.de
Ryo Maezono	JAIST, Japan	rmaezono at mac.com
Mariapia Marchi	SISSA, Trieste, Italy	marchi at sissa.it
Alston Misquitta	Cambridge University, U.K.	am592 at cam.ac.uk
Saverio Moroni	Istituto Nazionale di Fisica Nucleare, Trieste, Italy	saveriomoroni at gmail.com
Richard Needs	Cambridge University, U.K.	rn11 at cam.ac.uk
Fernando Reboredo	Oak Ridge National Laboratory, U.S.A.	reboredo at ornl.gov
Katie Schwarz	Cornell University, U.S.A.	kaschwar at gmail.com
Gaetano Senatore	University of Trieste, Italy	g.m.senatore at gmail.com
Priyanka Seth	University of Cambridge	ps479 at cam.ac.uk
Simone Taioli	Center for Materials and Microsystems, Trento, Italy	ucfbsta at ucl.ac.uk
John Trail	JAIST, Japan	jrtrail at jaist.ac.jp
Mike Towler	Cambridge University, U.K.	mdt26 at cam.ac.uk
Norm Tubman	Lawrence Livermore Laboratory, U.S.A.	tubman1 at llnl.gov
Lucas Wagner	Massachusetts Institute of Technology, U.S.A.	lkwagner at mit.edu

Sarah Krakauer, Tonia Sebastian, Jim Fry, Emma Drummond, David Drummond, Stacy Hennig, Matty Hennig
Ioana Campean, Maria Misquitta, Mark Misquitta, Sandra Korth, Samantha Keil, Saska Towler

2 FLIGHTS AND TRANSPORT

This section gives details on how to get to the Institute for people flying into Galileo Galilei Airport, Pisa. It is also possible to fly to Florence which is only slightly further away - though flights to this airport are limited. In principle one could also fly to other airports such as Perugia, Bologna, Ancona, Parma, Milano, Verona, Genova or Roma but you should count on a train ride of up to four or five hours to get to the Institute (we can arrange this for you). A list of airlines flying to Pisa from destinations within Europe is given on the TTI web page (see "Flying to Italy" in the left-hand column). Americans should note that Delta Airlines now operate a direct service to Pisa from New York. Further details about transport, including how to drive to the Institute, are also given on the TTI web site.

Participants should aim to arrive at Pisa airport on Saturday 24th July (Cambridge people on Friday 23rd). If this is not possible (e.g. if flights from your country are irregular) then we recommend having a brief holiday in Florence or similar before coming to TTI. If you really need to arrive early this can be arranged - contact us. Late departures are not possible however because of the summer school taking place immediately after the workshop - again, let us know if this affects you.

How to get to TTI from Pisa airport on Saturday 24th July:

Go to Pisa Centrale train station - either by taxi (c. 8 EUR) in five minutes from the airport (preferable) or by a short train ride from Pisa Aeroporto station (which you get to by walking out of one end of the airport concourse - turn left as you walk into the main hall). There is probably also a bus service, though I have never looked into this. From Pisa Centrale you then need to get a train to Barga-Gallicano. This is an isolated station north of the city of Lucca somewhere along a branch line going up the valley of the river Serchio into the mountains (see the map on the TTI web site). Depending on the train time, you may need to change at Lucca to get the train north - the train will usually be flagged as going to "Aulla", "Minucciano", "Piazza al Serchio" or "Fivizzano".

The train in question is a little unimportant train, and only tickets for big important trains tend to be available on the internet. It is easy to buy tickets on the station platform ("Uno a Barga-Gallicano. Solo andata."). On all Italian train journeys you are supposed to validate your ticket by getting it stamped in the yellow machines on the platform or you may have to pay a fine. Note that Italian trains are very (even absurdly) cheap by international standards, particularly British ones. The ticket should cost around 4 to 6 Euros.

At Barga-Gallicano station you should find a TTI representative who will meet each Saturday train as required and take new arrivals to the Institute. If no-one is there you can wait in the station café - do call if you have to wait more than five or ten minutes. Clearly we need to know in advance the time of the train on which you intend to arrive. The timetable is linked from the TTI web site, but all Saturday train times are in fact given in the table below. Note that the last train from Pisa is at 20:50 so it would be a good idea to arrive earlier in the day if possible (particularly if you want to enjoy the welcome buffet dinner).

In emergencies it is possible to get a taxi to Vallico Sotto from the station but in general this needs to be pre-booked - see the instructions on the web site (Barga Taxi : taxibarga@libero.it Tel. 340 1669279 or 348 8106112). If you are a non-Italian speaker who hasn't pre-booked and you need to talk to the guy (Marco) on the phone you will find he doesn't speak English so just say (phonetic) "Taxi a Vallico Sotto da la stasjonay di Barga-Gallicano?" or similar down a phone at him - the trip should cost 30-35 Euro. Note that "I don't speak Italian" is "Non parlo italiano."

In case of problems contact Mike on his mobile phone - 3479172621 (additional emergency assistance may be available from Samantha Keil on 00 44 7979 554034). TTI has two direct phone lines (0583 761608 and 0583 1805441) which you should use as a last resort.

3 TRAIN TIMETABLES

See www.ferroviedellostato.it/homepage_en.html.

Saturday 24th July, Pisa Centrale to Barga-Gallicano stations

dep. Pisa	arr. Lucca	dep. Lucca	arr. Barga-Gallicano
05:30			06:54
06:20	06:45	06:53	07:37
07:50			09:13
10:20	10:47	11:30	12:13
12:50	13:15	13:26	14:12
13:43			14:50
15:20			16:28
16:20	16:44	16:58	17:40
17:50			18:57
18:50			20:20
19:50			21:30
20:50	21:17	21:40	22:20

Saturday 31st July, Barga-Gallicano to Pisa Centrale station

dep. Barga-G.	arr. Lucca	dep. Lucca	arr. Pisa
06:02	06:45	06:53	07:16
06:43			08:12
07:24			08:42
08:41	09:25	09:42	10:12
12:00	12:50	13:12	13:42
14:02			15:42
15:14	16:00	16:12	16:42
18:46	19:34	19:42	20:12
20:10			22:12

4 SPECIFIC TRAVEL PLANS

Alston Misquitta, Ioana Campean, Maria Misquitta, Mark Misquitta
Arr Pisa 09:45 Wed 21 July. Train arr Barga-Gallicano@17:40.
Dep Pisa 22:40 Sat 31 July.

Martin Korth, Sandra Korth
Arr Pisa 14:30 Thu 22 July. Train 16:20 to Barga-Gallicano@17:40 (TAXI)
Dep Pisa 23:05 Fri 30 July.

Martin Krupicka
Arr Pisa 13:10 Thu 22 July. Train 16:20 to Barga-Gallicano@17:40 (TAXI)
Dep Pisa 07:00 Sun 1 Aug. Train Sat 31 July anytime - Pisa hotel.

Pablo Lopez Rios, Robert Lee
Arr Pisa 09:45 Fri 23 July. Drive to TTI in Pablo 7-seater hire car.
Dep Pisa 10:10 Sun 8 Aug

Richard Needs, Emma Drummond, David Drummond, Tonia Sebastian
Arr Pisa 09:45 Fri 23 July. Drive to TTI in Pablo 7-seater hire car.
Dep Pisa 10:10 Sat 31 July

Neil Drummond
Arr Pisa 09:45 Fri 23 July. Drive to TTI in Pablo 7-seater hire car.
Dep Pisa 14:55 Fri 6 Aug

Mariapia Marchi
Will arrive with Michele Casula in private car Fri 23 July, evening.
Drive directly to Vallico Sopra festival.
Dep Sat 31 July by train.

Michele Casula
Arr in private car with Mariapia Marchi Fri 23 July, evening
Drive directly to Vallico Sopra festival.
Dep Thu 29 July in private car

Michal Bajdich
Arr Pisa 11:40 Fri 23 July . Train 13:43 to Barga-Gallicano@14:50 (MDT)
Dep Pisa 13:05 Sun 1 Aug

Lucas Wagner, Elif Ertekin
Arr Florence Fri 24 July. Train to Barga-Gallicano@17:40 (MDT)
Dep ??

Norm Tubman
Arr Pisa 11:40 Sat 24 July. Train 12:50 to Barga-Gallicano@14:12 (PLR)
Dep Pisa 13:25 Sat 31 July

Jaron Krogel
Arr Pisa 11:00 Sat 24 July. Train 13:43 to Barga-Gallicano@14:50 (MK)
Dep Pisa 13:00 Fri 30 July

Priyanka Seth
Arr Pisa 09:45 Fri 23 July. Hotel. Train 12:50/13:43 to Barga-Gal@14:12 or 14:50
Dep Pisa ??? Sat 31 July.

Matthew Foulkes
Arr Pisa 14:30 Sat 24 July. Train 15:20 to Barga-Gallicano@16:28 (17:40) (PLR)
Dep Pisa 14:55 Fri 30 July. Train 08:41 from Barga-Gallicano.

Hai-Ping Cheng, Jim Fry
Arr Pisa Fri 23 July. Stay in Pisa hotel. Train 15:20 to BG. Pickup 16:28.
Dep Pisa 07:25 Sun 1 Aug. Train ??? to Pisa Sat 31 July, hotel.

Arne Luechow
Arr Pisa Sat 24 July. Train 19:50 to Barga-Gallicano@21:30 (MDT)
Dep Wed 28 July 08:41 on train from Barga-Gallicano to Bolzano (LIFT REQUIRED)

Henry Krakauer, Sarah Krakauer
Arr Pisa 18:35 Sat 24 July. Train 19:50 to Barga-Gallicano@21.30 (MDT)
Dep Pisa 11:30 Sat 31 July

Simone Taioli
Arr Pisa 14:30 Sat 24 July. Drive to TTI in 5-seater rental car.
Dep Sat 31 July by private car.

Ryo Maezono, John Trail
Arr Pisa 14:30 Sat 24 July. Drive to TTI in 5-seater rental car.

Dep Sat 31 July by private car

Richard Hennig, Stacy Hennig, Matty Hennig
Arr Florence 12:55 Sat 24 July. Drive to TTI in 5-seater rental car.
Dep Sat 31 July in rental car.

Katie Schwarz
Arr Florence 14:05 Sat 24 July. Hope to get lift with the Hennigs.
If not, get 16:27 from Florence S.M.N. Arr Barga-Gallicano 18:57
Will stay on for the summer school the following week (leaving Sun August 8)

Fernando Reboredo
Arr by private car Sat 24 July
Dep by private car Thu 29 July

Saverio Moroni, Gaetano Senatore
Arr Sat 24 July by private car
Dep Fri 30 July by private car

Dario Bressanini
Arr Sun 25 July, evening by private car
Dep Sat 31 July by private car

Claudio Amovilli, Franca Maria Floris
Drive to TTI Mon 26 July (afternoon)
Depart Thu 29 July

Rex Godby
Arr Pisa 15:35 Mon 26 July. Train 16:50 to Barga-Gallicano@18:21. (TAXI? LIFT?)
Dep Sat 31 July, morning - train to Florence.

Dario Alfe
Arr Tue evening by private car
Dep Fri morning by private car

5 ACCOMMODATION

TTI, ATTIC - two single mattresses
Dario Alfe
Mike Towler

TTI, NURSERY - one single bed
Richard Needs

TTI, PLAYROOM - two single beds, one double bed
Pablo Lopez Rios, Michal Bajdich, John Trail

TTI, PINK ROOM
Samantha Keil, Saska Towler

TTI, LILAC ROOM - two single beds
Mariapia Marchi, Katie Schwarz

TTI, TINY ROOM - one single bed
Martin Krupicka (Thu 22-Sun 25). Rex Godby (Mon 26 - Fri 30).

TTI, RED ROOM - one double bed
Henry Krakauer, Sarah Krakauer

TTI GARDEN ROOM - two single beds
Lucas Wagner, Elif Ertekin

TTI LIVING ROOM
Martin Krupicka (Mon 26 - Wed 28)

DOCTOR'S HOUSE, UPPER FAR ROOM - one double bed, one small bed
Richard Hennig, Stacy Hennig, Matty Hennig

DOCTOR'S HOUSE, UPPER MIDDLE ROOM - two single beds
Dario Bressanini, Ryo Maezono

DOCTOR'S HOUSE, UPPER NEAR ROOM - one double bed , one cot
Emma Drummond, Neil Drummond, David Drummond

DOCTOR'S HOUSE, LOWER APARTMENT - one double bed, two single bunk beds
Alston Misquitta, Ioana Campean, Maria Misquitta, Mark Misquitta

CASA GIANPIERO - ROOM 1 - one double bed
Franca Maria Floris, Claudio Amovilli

CASA GIANPIERO - ROOM 2 - two single beds
Saverio Moroni, Gaetano Senatore

CASA FRANCA - ROOM 1 - 1 double bed
Martin Korth, Sandra Korth

CASA FRANCA - ROOM 2 - 1 double bed
Hai-Ping Cheng, Jim Fry

CASA FRANCA - ROOM 3 - 1 double bed
Rob Lee, Tonia Sebastian

CASA FRANCA - ATTIC ROOM - 1 single bed
Fernando Reboredo

CASA ANNA MARIA - ROOM 1 - 1 double bed, 1 single bed
Jaron Krogel, Norm Tubman

CASA ANNA MARIA - ROOM 2 - 1 double bed
Arne Luechow (Sat 24 - Wed 28) Martin Krupicka (Thu 29 - Fri 30)

CASA ANNA MARIA - ROOM 3 - 1 double bed
Matthew Foulkes

BEDOJIN TENT (www.vallico.net/tti/tti_tent.html)
Michele Casula, Simone Taioli

PRIVATE TENT
Priyanka Seth

6 CONFERENCE VEHICLES

46 people, 55 (+10) seats

OFFICIAL VEHICLES

6 seater Fiat Multipla	(Mariapia Marchi, Martin Krupicka)
17 seater minibus	(Mike Towler)
7 seater hire car	(Pablo Lopez Rios)

PRIVATE VEHICLES

5 seater car	(Ryo Maezono)
5 seater car	(Richard Hennig)
5 seater car	(Dario Bressanini)
5 seater car	(Simone Taioli)
5 seater car	(Gaetano Senatore)

OTHER NON-OFFICIAL VEHICLES WHICH MAY BE PRESENT FOR PART OF THE WEEK:

5 seater car	(Dario Alfe)
5 seater car	(Fernando Reboredo)

SPARE DRIVERS FOR EMERGENCIES

Michael Bajdich

7 THINGS TO BRING WITH YOU

- The overheads for your talk if you intend to give one - see later section for supported formats.
- Your laptop, if you wish (though this is completely not necessary, as we have large numbers of them - see note in Technical Equipment section).
- Summer hiking gear such as boots, socks, little rucksacs, sunhats etc.
- Italian plug converters if you want to plug anything in (we have some spare but donations of these are gratefully accepted). Our sockets mostly have two round pins (with an optional third one between them). There are two types of thin prongs on European adaptors. You want the thinner of the two. Just to confuse things, there are also lots of totally incompatible English plug sockets into which English equipment can be plugged directly.
- Some Euros for spending in restaurants and shops. Please note that there is no easily accessible cash machine near the Institute, and although we might pass them from time to time on our afternoon trips, large numbers of people getting money out can cause considerable delays. There is a cash machine in Pisa airport to your right as you emerge into the arrivals hall (a cash machine has now been installed in Fabbriche di Vallico a few kilometres away - this is now much less flaky than when it was first installed in 2007 but relying upon it to actually give you money would not be sensible.).
- People who intend to visit caves or canyons should bring some clothes and old shoes that you don't mind getting wet and a head torch (though we have supplies of torches if necessary).
- Climbing equipment (harness, helmet plus via ferrata gear if you have them) if you intend to take part in activities where this will be needed. We have limited supplies which are not enough to go round.
- Light sleeping bag and a torch (if you intend to sleep in the Bedouin tent).
- Hay fever tablets, if you don't like living in the countryside.

- A musical instrument, if you can play a portable one. See Section 15.
- Sunscreen
- A towel
- Swimming costume (if you wish to go swimming).

In the traditions of earlier workshops, you might also optionally like to bring

- A nice bottle of wine (or whatever passes for it in your country).
- An interesting thing

8 CONFERENCE SCHEDULE

This section contains the schedule for the conference, including a list of talks. The number of talks per day is deliberately small to allow time for thinking, discussion and deliberation. In principle there could be evening discussion sessions if required. If you do not wish to give a talk, or if you wish to give a shorter/longer talk than suggested, please ask. All excursions and activities are, of course, optional - and you may elect simply to relax at the Institute in the afternoons, or to make up your own activities. I have to book restaurants well in advance for such large groups so please make it known as soon as you can if you do not wish to attend particular meals.

Friday 23rd July

EARLY ARRIVALS

We will attend the 'Vallico Sopra Festival' (19-21 people)

Dinner : whatever you can find

Dancing : will include the 'quadriglia' and the 'moresco'. Please learn these before you come as they will expect us to be dumb foreigners who don't know a damned thing about dancing. Videos are available on the internet.

References:

QUADRIGLIA

<http://it.wikipedia.org/wiki/Quadriglia> (Italian)

<http://en.wikipedia.org/wiki/Quadrille>

<http://video.google.com/videoplay?docid=4244880046284709135#>

MORESCO

http://www.youtube.com/watch?v=3PQt9T_yzh8 (excellent demonstration)

Saturday 24th July

ARRIVALS

Excursion for early arrivals (total walking time 6 hours, total travel time 2.5 hrs). You will need to arrive at TTI on Fri 23rd to take part in this expedition.

Assault on the "Via Ferrata Tordini-Galligani". "A climbing adventure in front of the north face of Pizzo d'Uccello" - the Matterhorn of the Apuan Alps. (p.120, red Tuscany North book).

Volunteers: Mariapia Marchi, Michele Casula (driver), Michal Bajdich, Lucas Wagner, Elif Ertekin, Neil Drummond, Martin Krupicka (driver)

Please take via ferrata kit, harness, and helmet (available in the climbing rack in the TTI church). Try them on and learn to use them the night before..

Leave TTI at 8:20 am to take the 09:14 train from Barga-Gallicano arriving at Equi Terme at 10:01. (There is an earlier train at 06:55 from BG, arr ET 07:39 - perhaps advisable to do this?)

Return trains are:

14:26 Equi Terme 15:13 Barga-Gallicano
16:49 Equi Terme 17:30 Barga-Gallicano
19:24 Equi Terme 20:09 Barga-Gallicano

Please try very hard to be on the 16:49 one. Please phone Mike if you're not.

Train cost: 3.10 EUR each way.

7pm : Welcome buffet dinner and drinks in the Institute garden.

Sunday 25th July

8.30am : Mike Towler (5 minutes)
- "Welcome to Tuscany"
8.35am : Pablo Lopez Rios (50 minutes)
- "VMC sampling efficiency"
9.30am : Fernando Reboredo (50 minutes)
- "New developments in self-healing diffusion Monte Carlo"
10.30am : Richard Needs (50 minutes)
- "Materials at terapascal pressures/Testing some pseudopotentials"
11:30am : Michal Bajdich (25 minutes)
- "Quantum Monte Carlo study of a model of spherical jellium with impurity and self-healing quantum Monte Carlo calculations of atoms and molecules."

12.30pm : CHURCH (if you want)

POSSIBLE EXCURSIONS:

Trip to Alto Matanna. Numerous spectacular walks of varying difficulty. See the Versilia coast, Elba, Corsica and sometimes even France from the easily accessible summits of some of the more beautiful scenery in the Apuan Alps. Bring one of the Institute's antique telescopes to watch the more courageous of you scale the 500 foot cylindrical barrel of Monte Procinto. Followed by drinks and dinner in 19th Century Alpine hotel.

- Balloon station walk (short and easy)
- Monte Matanna walk (medium) possible extended to Monte Nona.
- Monte Procinto climb (strenuous)
- Monte Croce circular walk from Palagnana (strenuous)
- Grotta all'Onda walk (Neanderthal cave) (strenuous)

DINNER : Matanna (BOOKED FOR 42*-->41 - 0584 776005)

Monday 26th July

8.30am : Arne Luechow (50 minutes)

- "Efficient multi-reference DMC and insight from QMC"
- 9.30 am: Matthew Foulkes (25 minutes)
 - "Experiments with Alavi's FCI-QMC method"
- 10.00am : Dario Bressanini (25 minutes)
 - "QMC for boranes and azaboranes"
- 10:30am : Mariapia Marchi (50 minutes)
 - "The spin susceptibility enhancement in wide AlAs quantum wells"
- 11:30am : Alston Misquitta (50 minutes)
 - "Many-body dispersion interactions in semiconducting wires"

POSSIBLE EXCURSIONS:

- Walk Matanna to Monte Forato (rock arch) to Fornovolasco - new ferrata route
Tana che urla cave
- Walk Palagnana-Monte Croce-Fornovolasco
- Grotta del Vento tourist cave
- Fornovolasco church and flood frescoes
- Independent cave-hunting (ask Mike)
- Swimming at Barga
- Staying in the monastery

DINNER : New Eremo di Calomini (TO BOOK FOR 41* - 0583 767041)

Tuesday 27th July

- 8.30am : Rex Godby (25 minutes)
 - "Quantum transport: electron-electron and electron-phonon effects"
- 9.00am : Claudio Amovilli (25 minutes)
 - "Some applications of QMC to chemistry"
- 9.30am : Neil Drummond (50 minutes)
 - "First-principles study of a positron immersed in an electron gas"
- 10.30am : Saverio Moroni (25 minutes)
 - "Energy derivatives in fixed-node QMC: unbiased estimates with finite variance"
- 11.00am : Jaron Krogel (25 minutes)
 - "Hunting the anomalous excitations in bcc helium-4"
- 11.30am : Martin Korth (25 minutes)
 - "Accurate thermochemistry with FNDMC"

A DAY IN THE VILLAGE

- Relaxing, sunbathing, reading, studying, discussing

POSSIBLE EXCURSIONS:

- Circular walk from Vallico via San Luigi and Pian di Lago to the Trassilico fortress and back via the landslide.
- Turrte di San Rocco canyon walk
- Independent cave-hunting (ask Mike)
- Boating on the Turrte Cava lake (+ Buca del Lago della Turrte Cava)

DINNER : Da Sandra (BOOKED FOR 46* - 0583 761712)

Wednesday 28th July

- 8.30am : Lucas Wagner (50 minutes)
 - "Adventures in open source quantum Monte Carlo and hydrogen storage nanoclusters"
- 9.30am : Michele Casula (50 minutes)
 - "Quantum Monte Carlo methods as an exact route to correlated regimes in 1D systems"
- 10.30am : Gaetano Senatore (50 minutes)

- "Valley susceptibility of quasi-2D electrons in AlAs quantum wells"
- 11.30am : Dario Alfe (25 minutes)
- "Surface free energies and absolute rate of desorption from quantum Monte Carlo"

POSSIBLE EXCURSIONS:

- Monte Sumbra
- Coreglia di Antelminelli and Buca delle Fate
- Swimming and shopping in Bagni di Lucca
- Staying in the monastery

DINNER : Il Laghetto (BOOKED FOR 41 - 0583 75798)

Thursday 29th July

-
- 8.30am : Mike Towler (25 minutes)
 - "The magic of moving nodes"
 - 9.00am : Richard Hennig (25 minutes)
 - "Quantum Monte Carlo for point defects in Si and ZnO semiconductors"
 - 9.30am : Henry Krakauer (50 minutes)
 - "Auxiliary-field QMC for quantum chemistry: recent progress and open issues."
 - 10.30am : Norm Tubman (25 minutes)
 - "Release node for small molecules"
 - 11.00am : Ryo Maezono (25 minutes)
 - "Weak interactions treated by DMC"
 - 11.30am : Katie Schwarz (25 minutes)
 - "Quantum Monte Carlo backflow calculations of the benzene dimer"
 - 12.00am : Elif Ertekin (25 minutes)
 - "Confessions of a materials scientist: the defect behaviour of perovskites and other oxides"

A DAY IN THE VILLAGE

- Relaxing, sunbathing, reading, studying, discussing
 - Metal detecting
 - The Vallico Sotto Game
 - Abseiling to the Buca della Fate di Vallico di Sotto
 - Football match - Vallico Sotto against the world/Vallico Sotto contro il mondo
- DINNER : Provided by Federico and friends at Vallico Sotto (BOOKED FOR 41)

Friday 30th July

-
- 8:30am : John Trail (50 minutes)
 - "Some estimates in variational quantum Monte Carlo"
 - 9.30am : Simone Taioli (50 minutes)
 - "SURPRISES: when ab initio meets statistics in extended systems"
 - 10.30am : Hai-Ping Cheng (50 minutes)
 - "Magnetism in carbon nano-ribbons; study of metal clusters using QMC"
 - 11.30am : Priyanka Seth (25 minutes)
 - "QMC calculations of the first row atoms - continued"
 - 12.00am : Robert Lee (25 minutes)
 - "Random errors and outliers in QMC"

POSSIBLE EXCURSIONS:

- Lucca
- A surprise excursion not organized by Mike (suggestions please)

- Staying in the monastery
DINNER: Canapale, Vallico Sopra (BOOKED FOR 31)

Saturday 31st July

DEPARTURES

POSSIBLE EXCURSIONS FOR THOSE WHO ARE NOT LEAVING IMMEDIATELY.

Extra unassigned activities which can be easily planned:

- Orrido di Botri
 - Buffardello park
 - Random cave hunting trips following new cave maps acquired this year (e.g. Campolemisi, Fabbriche di Vallico, Antro della Paura, Motrone)
 - Lucca Villas
 - Pietrasanta
 - Vinci (Leonardo's birthplace)
 - Walk from Collodi to Pescia
 - Local mountain trips (Pania della croce etc..)
 - Marble quarries
 - Beach trips to e.g. Sestri Levante, Portofino, Cinque Terre
-

9 TTI TECHNICAL EQUIPMENT

There are various Sony Vaio and four Acer Ferrari 4005 laptops in the Institute available for public use, almost all in dual-boot configurations running OpenSuse Linux (preferred) and Windows XP or Vista.

All connections are made through a standard wireless network. If you wish to bring your own laptop then it therefore needs to be wireless-enabled if you wish to log into the network (for older machines we have three spare wireless network cards that you can plug into your laptop PC card slot). The Institute SSID is 'TTI' and the network is completely unencrypted due to the total absence of hackers, or indeed computers, in remote mountain villages. Since June 2009, TTI is hooked up to the local 2 Mb/s wireless broadband network.

Apart from computers and networking devices, we also have the following equipment available:

- Canon Pixma ip4000 colour inkjet printer (on a wireless print server, so one can print from anywhere in the Institute)
- Hi-Ti Transphotable photo printer for instant printing of your photographs (you can plug in your camera directly - no need to go through a laptop - accepts all memory card formats that I am aware of).
- Epson Perfection 4990 scanner
- A3 laminator
- Guillotine.
- Finepix F455 digital camera
- Four memory sticks
- Driver disks for most of the above.

- A supply of writeable CD-Rs, CD-RWs and DVD-Rs.
- The usual stationery and staples etc..

There are also a very large number of scientific and technical books which may be borrowed (top floor of the main building, and in the various bookshelves in the church).

Please note that this year there is a new pigeon-hole bookcase intended for printouts of 'the literature'. This has been set up to include all the relevant papers for "21st-century directions in de Broglie-Bohm theory and beyond" - a huge conference we are running in late August. You are welcome to borrow these papers, but please put them back in exactly the same place you got them from as they are all carefully filed..

10 INTERNET USE

TTI laptops are mainly black/grey Sony Vaios with a few red Acer Ferraris (note the difference in power supplies - the ones for the Ferraris have yellow ends, the Sony machines have black ones). All but `tti_laptop1` are in dual boot configurations with some version of OpenSuse Linux and Windows XP/Vista - after turning them on you should choose which OS you want. All will boot into Linux after some time by default unless you say otherwise. We essentially never use Windows here so the setup on the Windows partitions will be minimal if it has been done at all.

Since June 2009 the monastery's local network connects to the outside world through a 2Mb/s wireless broadband network (having previously been on dialup!). All local machines have static IP addresses 192.168.1.2x (where 2x is 20 plus the number of the machine - a red plastic label saying e.g. `tti_laptop9` implies 192.168.7.29) so they can all talk to each other via ssh or ftp etc. With appropriate software all 24 laptops can be run as a parallel supercomputer should anyone need to do intensive calculations.

Other network details for administrators: IP 192.168.1.xx (static xx=10-99, DHCP assigned numbers from xx=102-200), Gateway 192.168.1.1, Primary DNS 62.94.0.41, Secondary DNS 212.216.112.112.. The router has a (password protected) web page at 192.168.1.2. Other equipment attached to the network: a VoIP phone (192.168.1.98), an internet radio (192.168.1.99), a wireless print server (192.168.1.101), and possibly the NEC projector on DHCP. Do not assign your own static IP number on personal hardware without consulting MDT.

Please be mindful of the needs of other users of the network. Although we have broadband, it is hardly a superfast connection, and downloading Gb of files to patch your machine or whatever is discouraged.

Note also that there is network coverage only in the main TTI building and not in any of the other houses we use for accommodation (Doctor's House, Casa Franca, Casa Anna Maria, Bedouin tent, Casa Inglese, Casa Mandy etc.).

11 PRESENTATION EQUIPMENT

The church is equipped with a good quality NEC MT1075 projector and an auxiliary Toshiba DPD TDP-T250U projector with DVI and regular RGB cabling . There is a giant 16' by 12' main screen, a 7'8 x 5'9 electric auxiliary screen, an Avervision document camera, a dual projection stand, a laptop, a DVD player with decent speakers, and various wireless control devices. There is a giant blackboard in the church and a smaller one in the main corridor stolen from the TCM Seminar room in the Cavendish Laboratory. There are two blackboards outside, and a portable one which can be taken on excursions if you wish to debate physics in restaurants or up mountains.

The NEC projector is wireless capable, so you can beam your talk from your laptop straight to it from anywhere in the room, as well as with old-fashioned direct connection (technical specs on the TTI website). The Institute laptops - each equipped with some Linux distribution (choose from Suse Linux 9.3/10.0/10.2/10.3) and Windows XP/Vista - will of course also take CDs and memory sticks and have the usual software such as Acroread and Powerpoint. On balance it is probably best to bring your talk on

a CD or USB device or email it to MDT beforehand and he will ensure that it is on the relevant machine ready for your talk.

The Avervision document camera is a sort of cool overhead projector. It will display any printed document, photo, slides, X-ray film or 3D object straight through the projector, so basically you can dissect a frog live on the wall. There is a Victorian microscope with an attachment that allows it to be connected to the Avervision, so biological people can project the microworld on the big screen. Although we have a table with a white square painted on it, non-electronic talks are probably better on white pieces of paper rather than on transparencies..

12 EXCURSIONS AND ACTIVITIES

The various excursions and activities are divided into categories according to the physical effort involved. As there will be around 40 people at the conference, it is envisaged that each day the group will split into two or more subgroups, with the hot young muscular virile people doing the strenuous excursions, and the lazy, old and unfit doing more relaxed activities. Although we have incorporated suggested activities into the programme above, everyone is welcome to consider the following list and also to consult the various guidebooks in the TTI library in order to suggest alternative activities.

12.1 Very strenuous activities

- Climb the peak of Pizzo d'Uccello. Requires early start with no other activities (e.g. day before conference). See www.tcm.phy.cam.ac.uk/~mdt26/tti2/photos/pizzo_ducello.jpg. Enough said. They don't call it the 'Matterhorn of the Apuan Alps' for nothing.
- The ascent of Monte Procinto. This is a huge cylindrical rock tower with a belt of trees around its middle from which rise 500-foot walls, overhanging on every side. Michelangelo had the idea of carving it into a gigantic sculpture along the lines of Mount Rushmore but never got round to it. You can see the mountain here: www.vallico.net/procinto.jpg. Yes - the walls are more or less vertical, but there is a *via ferrata* to clip yourself onto. Instruction, assistance, and the necessary equipment can usually be supplied - but we only have about eight harnesses so bring your own if you have one!
- Reach the high peak of Pania della Croce from Piglionico (described as 'The finest peak in the whole of Italy' in *Below the Snow Line* - one of the 19th century books in the TTI Antiquarian Library). Also features in Dante's *Divine Comedy*. This defeated some of TTI finest mountaineers for several years before they finally succeeded in 2007 (note - it isn't that hard if you move quickly).
- Find the spectacular natural rock bridge of Monte Forato (under which someone once flew a bi-plane). Start from Fornovolasco (lots of up) or from Matanna (much easier) or even have two groups that meet in the middle and exchange car keys. New for 2009: there is a fun *via ferrata* traverse on the way to the arch from Matanna, and we will do a new route via Foce di Valli.
- Find the Neanderthal cave (Grotte all'Onda) down the slope from the balloon station near Matanna. "This vast grotto stretches 40 x 60 meters and it originally hosted numerous internal tunnels, which are obstructed today. Its enormous cavity offers important evidence that suggests the frequency with which people entered the grotto, from pre-historical times to more recent periods. The first people to use the cave were Neanderthals; they hunted throughout the surrounding area and probably used it to hoard their tools and weapons, together with the bones of the animals they cooked. Hunters from the Superior Palaeolithic period (Homo Sapiens) lived in the more external part of the grotto where they set up a giant hearth. Later, Neolithic farmers and shepherds planted their huts in the shelter of the grotto's vast vault, carrying out their daily activities there during many seasons. This cave was also used during the Neolithic period (the Bronze Age), during which new models were developed for decorating ceramic. During this period, new raw materials, imported from distant locations, were adopted to make special equipment. From the post-Bronze Age until recent times, the grotto was not continuously frequented."

- The new Geoscopia web site ([link/instructions at www.vallico.net/tti/tti_mountaineering.html](http://www.vallico.net/tti/tti_mountaineering.html)) shows precise locations of all of the thousands of caves in Tuscany (even the crap ones) together with a brief technical description and a plan of the cave. Interesting little expeditions may be made that have the aim of finding the entrance to particular caves, as well as exploring them. This is of course the most fun that a boy can have. The Apuan Alps have more caves than you can possibly imagine, so this will still be a viable activity in 2050. In particular, ask Mike about the untried Campolemisi, Fabbriche di Vallico, Motrone, and Antro della Paura expeditions.
- Explore the canyon of the Turrice di San Rocco river. This starts from the fork in the river upstream from Fabbriche di Vallico before you get to Gragliana. Take the left-hand fork. The aim is to go all the way through it to take coffee at the cafe near the Chiesa di San Rocco in Turrice, but as of July 2009 we have been unable to establish if this is feasible. (MDT only had a spare ten minutes and went in a few hundred yards - it seems great). Be prepared to get wet. Someone told me there was a great natural swimming pool in there. Once reaching the village where the cafe is (there is also a children's playground and a nice river) you will have to bribe a local (pool your Euros) to give your driver a lift back via Focchia to your van. Use your initiative here.
- Morning workout. Run from the Institute each morning at 6am to the spectacular summit of Monte Palodina in order to tone up your thigh muscles and pep yourself up in preparation for the morning's talks. Mad people only.
- Complete the Cinque Terre coastal walk, a four-hour excursion through some of Italy's most spectacular scenery, or a similar walk near the famous seaside haven of Portofino.
- *Orrido di Botri* canyon walk. The Orrido is a giant canyon created by the Pelago river in the Apennines (about an hour's drive from the Institute) with deep steep walls as high as 200 metres and in some places only a few metres apart. This is a geologists' and naturalists' paradise. It can only be visited with helmets and suitable clothing you don't mind getting wet. There are some nice long walks in the country above the canyon (watch out for marmites and Royal Eagles - this is one of your best chances to contribute to the TTI Wildlife Photography expedition).
- There are of course any number of spectacular high mountain expeditions in the Apuan Alps and the Institute has a library of guidebooks which you can browse through. Let me know if you want to try anything else (that will fit in the clearly limited amount of time). There is also the TTI Antiquarian library (Mountaineering section) to inspire you.

12.2 Quite strenuous activities

- Go to Alto Matanna at the end of the Turrtecava valley and visit the beautiful nineteenth-century hunting lodge that was once the destination for travellers in Rosetta the Balloon on her aerostatic cableway. See the old balloon station at Foce del Pallone and the extraordinary view. On clear days you can see Elba - 100 miles to the South - and sometimes the even more distant Corsica and the French Alps. Come back over the top of Monte Matanna and descend back to the lodge. Take one of the Institute's antique telescopes with you.
- From the Matanna hotel, climb up to the cross on the adjacent ridge for a spectacular view of Monte Procinto, Stazzema and the Apuan Alps. From there you can climb Monte Matanna the other way around, or visit the donkey and his little horse friends who live on the top of Monte Nona. Or you could go on a longer walk below the Giant West Wall of Nona, threading past Monte Procinto, and round the back of Monte Nona which will take several hours. Finish up the day with a fabulous dinner in the Matanna hotel.
- Take part in the latest expedition to the ancient cave known as the *Tana di Cascaltendine* which is the subject of Pietro Magri's 1880 book *An expedition to Mount Gragno and the Cave of Cascaltendine* as translated by Mike and available on the TTI web site (click the Local History Projects link). The 2007 summer school crew were able to photograph the result of the following quote: '*Before coming down from the cavern we used a chisel to inscribe our initials and the year 1880 on both walls of the passage near the entrance.*'. This was done in the "Palace of Ismeno" which was the name Magri's group gave to an extensive cave whose entrance is a 6 foot hole about forty

feet up a cliff - the full story is on the News from the Towler Institute blog. It is also known that the cave continues for a kilometre beyond where we have penetrated before and this remains to be explored (note that in summer 2007, Mike and Evans went up the big wall in the final chamber with the dangling rope - a place many TTI visitors have visited before - with somewhat amusing consequences - see the blog story 'Bronze Hermaphrodites and the Fat Boy Filter'). Expedition to be followed by cold beers and refreshments in the lovely village of Cardoso, or a circuit of Monte Penna hunting for the lost Cave of the Fairies..

- Visit the Selva del Buffardello adventure park (www.selvadelbuffardello.it/index.php?lang=eng). I quote from their web site: "Among the centuries-old fir trees some acrobatic forest paths, open to everybody, have been created and their aim is to show the wood from a different and adventurous point of view: hanging in the air. It is a challenge for children, youth and adults, who can test their ability with suspension bridges, swinging beams, vertical nets, ropes and obstacles, finding again their lost adventurous spirit. The Adventure Park 'Selva del Buffardello' in San Romano in Garfagnana (locality Pra di Lago) is a real novelty in the Appennino Tosco Emiliano. An old wood of two hectares and a half in the heart of Garfagnana, near the natural 'Parco dell'Orecchiella', with a wonderful view on the Alpi Apuane and on the Fortezza delle Verrucole (old castle). The park entrance is free if you don't practise in the adventure paths." We have never tried this, but it looks like great fun.
- TTI management has discovered that there is a secret underground tunnel in Vallico which starts from the Doctor's House next door to the Institute (a former barracks) and which goes up to the Rocchetta above the village (the site of an old castle on the summit of a little hill, where we now pitch the Bedouin Tent). This was used in mediaeval times for escape from the frequent warfare so common in these parts. The supposed entrance to the tunnel was bricked up (we think) in the 1930s - there are a couple of elderly men in the village who vaguely remember it. This summer we hope to unblock the entrance and explore. We also wish to find the upper entrance, so if you know anyone who has a ground-penetrating radar set we can borrow, let us know. This will probably be one of the next thrilling tales in "News from the Towler Institute".
- Explore the Vallico Sotto mule trail and the spectacular forgotten waterfall of Cascata Pendolina - one of the highest in Italy. Vallico was only connected by road to the outside world in the 1960s - before then people went up and down the *mule trail*. This has now been forgotten and is a little overgrown (though less so following TTI clearing activities) but is still very beautiful. Once we reach the bottom of the valley we will head over the river to the site of the Cascata Pendolina where we will take lunch. On the way back the bravest people will try to ascend the *Canyon of the Pili* carved by the Rio Selvano (you will get wet!). EDIT: and they will fail - I have recently discovered the only way you can feasibly do this is to *descend* from the top. Apparently this canyon is quite famous - the Apians group from Castelnuovo organize tours through it. One of these days I will have to attach myself to one of these expeditions to learn how to do it. Apparently there are 12 major waterfalls to descend - photos and rough maps are linked from the Mountaineering page of the web site.
- Explore *Buca della Freddana* cave near the mule trail from Vallico Sopra to San Luigi. This was (re-)discovered by Mike in Easter 2007 following conflicting and confusing advice from several local old ladies who remembered its existence from 40 years ago. He has also found the upper entrance of the same cave on the summit of Monte Penna - the two are apparently connected by a 1 kilometre passage. The old ladies have advised us not to go inside because of the evil monsters and dark pits that lurk within, but then again, they always say that. Dare you explore?
- Five a side-football (a new fenced pitch was constructed in Vallico a couple of years ago) or regular football (on the local full-sized pitch).
- Rock climbing or low-level bouldering - the Institute should have some ropes and climbing equipment. I've read that there is good climbing near the Trombacco dam in the next door Fornovolascio valley - ask MDT for more details. Don't forget to bring climbing boots and a harness that fits if you want to do this seriously (we have a rope you can borrow).

- Pietro Magri in his 1880 book mentioned above states that there are two other caves in Monte Gragno besides the Tana di Cascaltendine. Today no-one seems to know where they are. Having found the Buca della Freddana, Mike has narrowed down the lost “Cave of the Fairies” to a relatively small area. Can you find it?
- Traverse from Santa Luigi via Monte Palodina and the cliffs of Monte Gragno past the giant karst depression of Pian di Lago to the spectacular Rocca Estense fortress of Trassilico. Come back along the road past La Fornace.
- Explore the *Tana che urla* (the Cave that Screams!) - first explored and scientifically described by Vallisneri in 1726 - off the footpath to Foce di Petrosciano from Fornoalasco. This isn't a tourist cave suitable for your mum - so bring some appropriate clothes and torches. By the summer the Institute should have some proper speleological equipment to hand round. If you can read Italian, have a look at www.buffardello.it/attivita/pubblicazioni/di_alcune_grotte.pdf.
- Go on a beautiful walk over the highest stone railway bridge in Europe to the church in Sambuca.
- Go wild boar hunting.
- Learn to play local sport *palla elastica* (elastic ball) with the village youths.
- Use TTI's two inflatable boats to play on the Turritecava lake - accompanying picnic recommended. Have races. Try to find the Buca del Lago della Turrite Cava (as you sail towards the dam, it is on the left just after the exit of the second road tunnel).
- Go kayaking on the Turritecava. Bring your own canoe.
- Explore the ancient *Vasaio di Motrone* cave in the nearby village of Motrone (see www.apuane2007.it/italiano/vasaio/zona.vasaio.php).

12.3 Relaxed activities

- Visit the Pinocchio park, the Garzoni gardens, and the Collodi butterfly house in Collodi. See www.pinocchio.it/park.htm. From the website: “Inaugurated in 1956, the Pinocchio Park is no ordinary theme park, but rather a precious masterpiece created by artists of great character working together. The literary itinerary, marked out by mosaics, buildings and sculptures set amidst the greenery, emerges from an inspired combination of art and nature. The path is winding, and the dense vegetation means that every stage on the route comes as an unexpected surprise, with the very plants and trees contributing to create the atmosphere and the episodes in the story of the Adventures of Pinocchio. The Park itself is the site of constantly renewed cultural activities that are always mindful of its roots: exhibitions of art and illustrations inspired by childrens literature and the Story of Pinocchio, puppet-making workshops, puppet and marionette shows and minstrels enliven the visit to the Park, depending on the season. ”. For the gardens: “The historic Garzoni Garden, one of the most beautiful in Italy, represents a felicitous synthesis between Renaissance geometry and the spectacular quality of the nascent Baroque. The garden is a work of art of rare equilibrium, where the greenery, the flights of steps the water plays and statues form a truly unique ensemble. It is an absolutely unforgettable experience to lose oneself amidst the wonders of this fantastic place: grottoes, theatres carved out of box hedges, statues representing mythological creatures, satyrs, female figures, greenhouses with peacocks, forests of bamboo. An ancient, and somewhat arch tradition considers the visit to be propitious for lovers, and not only on account of the leafy shade and the arbours that offer secluded spots for tender caresses, but also of the maze, a symbolic allusion to the path to follow together throughout life. As soon as we enter the garden we come upon delightful parterres, statues and two large circular pools. Proceeding we then reach two magnificent double ramps of steps featuring a complex hydraulic system that supplies the water plays. These steps lead to the three upper terraces. Beyond is the impressive water staircase, flanked by two female statues representing the eternal rivals Lucca and Florence. At the very top is the statue of Fame blowing into a shell, emerging from which a jet of water traces out a lofty arc. Leading off the main route through the garden are numerous side paths and avenues where we can discover its marvels among the fragrances of the different plants, the plays of light and shade

of the vegetation, the intrigue of the mazes and the enchantment of the sculptures. The garden has recently been restored.”

- The Opera Barga festival is usually on at the same time as the conference (25th July-8th August in 2009). Ask Mike in advance for tickets and reservations.
- Look in the latest issue of Lucca "Grapevine" magazine in English for local cultural activities and concerts etc..
- Play with the Institute's Victorian Scientific Instrument Collection.
- Spend the afternoon bathing in the outdoor hot pool at the ancient thermal baths of Bagni di Lucca (one of the most fashionable spots in Europe in Lord Byron's time - the Switzerland of Tuscany!). Followed by shopping, sightseeing and coffee in the town centre.
- Samantha has two other favourite open-air pools at Galliciano and Barga. These are like little beach resorts where one lazes about on deckchairs and has the occasional dip.
- Watch the night sky through the Institute's astronomical telescope.
- Visit the ancient city of Barga (www.barganews.com) for an afternoon's relaxed sightseeing, shopping and culture.
- Visit the beautiful city of Lucca.
- Visit Castelnuovo di Garfagnana, where you can find Andrea's (the 'Indiana Jones of the Garfagnana') famous Osteria, where all day you can sample fabulous local wines, cheeses and snacks.
- Follow in the footsteps of Michaelangelo, and visit some of the Apuan Alps famous marble quarries.
- Day trip to Florence.
- Drive to the next valley along from ours over a spectacular high mountain road where the eagles live. Visit the Grotta del Vento - the Cave of the Winds (www.grottadelvento.com). This is the most famous cave system in Tuscany and the visitor will enjoy a spectacular and bizarre landscape of caverns and lakes. Take a pullover as the temperature is a reliable 10 degrees the whole year round. Then head down the valley to visit the *Eremo di Calomini* - an ancient monastery built into a high steep cliff.
- Table football and drinking in Fabbriche di Vallico.
- Horse riding at La Fornace.
- Various mild short walks around the Institute.
- Digging the Institute garden and doing little DIY things like restoring the church or clearing paths (I say this merely in hope..).

12.4 Very relaxed activities

- TTI now has a high-definition video camera. Make a film of life at one of the world's best conferences.
- Budding archaeologists may use the TTI metal detector - bought following last year's spooky event when Evans and Mike were digging a hole in the ground for the satellite dish (I'm really not making this up): MIKE: Hey Evans, watch out for crucifixes when you're digging that hole. This used to be a monastery you know. EVANS (REACHING INTO THE HOLE) What, like this one? (HOLDS UP A THOUSAND YEAR OLD BRONZE CRUCIFIX FROM FIVE FEET DOWN).
- Spend all day in the TTI garden relaxing in one of the Institute's three hammocks, drinking wine, snoozing or reading one of the books from the TTI library.

- The Institute has a variety of board games, jigsaws, and similar entertainments together with a number of Victorian books with titles like "What To Do On Cold Winter Evenings Given That We Haven't Invented Television Yet".
- Debate physics with the help of the Institute blackboards.
- Listen to one of Mike's tedious lectures inspired by the contents of the TTI Antiquarian Library such as *Richard Burton and the Source of the Nile* (Burton the Victorian explorer and polymath, not the one out of *Where Eagles Dare*..) or *Up The Orinoco with Alexander von Humboldt*.
- Spa treatments in the Bagni di Lucca "Thermal resort".
- Mike is translating some chapters of a book on the history of Vallico Sotto. If he's finished it by the time you visit, then walk around the village looking at the buildings and places it describes.
- MDT has taken to writing stories about events at the Institute and publishing them on his blog at the local Barga News website. See www.barganews.com and the "News from the Towler Institute" blog (or go to the TTI web site www.vallico.net/tti/tti.html and click on the relevant link in the left-hand column). So far these are mainly about cave explorations and similar adventures. However, Mike doesn't have a monopoly on this. If you wish to contribute your literary efforts then please send your stories about your adventures in Italy to him, and they will be published on the blog.

12.5 General

- The Institute has a wildlife photography notice board. Prizes for the best entries, particularly if you can take a picture of one of the eagles that regular soar above Vallico or of the elusive *marmite*.
- The Towler Institute Exploration Society also has a photographic competition running - see the web site for details.
- Revitalize the economy of Vallico Sotto. It's barely 40 years since 450 people lived here. Now less than 100 do so. Just because modern lazy teenagers want to be fashion models smoking drugs in Milan rather than having a nice healthy outdoor life, the population of rural Italy has been denuded. Let's bring back the time when all the mountain terraces were in production, packs of nice mules helped carry things, teams of volunteers kept paths and bridges open, and everyone knew how to bake chestnut cakes. All serious suggestions gratefully received.

13 FOOD

In general breakfast will be taken in the Institute, and lunch in the little bar in Vallico Sotto run by the lovely Monica.

In the institute some basic food staples will be provided which participants should feel free to fight over but in general you might like to buy your own food in the village shop run by the lovely and friendly Adelina. However sadly you can't because it closed in late 2007 - much to the consternation of all she has now relocated to a big new shop down in the main valley in Pian di Coreglia. To replace her, there are two food shops in Fabbriche di Vallico - five minutes drive downhill, and a giant Leclerc supermarket in Gallicano (twenty-five minutes drive).

To find the Vallico Sotto bar for lunch, go down the tunnel underneath the Doctor's house (the big house opposite the TTI church front door). Then take any path downwards until you get to the Vallico main square - the bar is just underneath that.. You are strongly encouraged to take your lunch here, as normally it doesn't serve food and Monica is doing us a big favour by buying food and preparing it - so we need to make it worth her while . Note you can also get beers and coffees and so on here..

Note that people in local shops - or indeed anywhere round here - tend not to speak English, so learning some basic Italian food words before you come will help : *pane* = bread, *formaggio* = cheese, *prosciutto*

= ham, *pomodori*=tomatoes, *birrà* = beer, *vino* = wine, *caffè* = coffee, *latte* = milk, *grazie!* = thank you!.

You are of course welcome to make use of the Institute's cooking facilities whenever you want; in fact why not cook a lovely meal demonstrating the delicious cuisine of Kazakhstan, or wherever it is that you come from? There is a big downstairs kitchen in the main building with a total of 10 rings formerly run by a proper cook, and a small upstairs kitchen. The Institute even has its very own *Il Collegio Cookbook* written and published by former owner Leonie Whitton whose recipes you are encouraged to try. There are also two kitchens in the adjacent Doctor's house which will be rented for the duration of the conference, and one in the Casa Franca house.

On the first evening a simple buffet dinner will be provided. Later in the week the Institute's 16th Century pizza oven may be pressed into service. The rest of the time we will make use of the excellent local restaurants - these are mostly incredibly cheap. Given the large number of people staying at the Institute, people are encouraged to break up into at least two groups, although many of them - especially Da Sandra - are large enough to handle everyone. Unless told otherwise, Mike will simply assume that you will be coming to each evening meal and will make bookings accordingly (generally a few weeks in advance). these bookings can be changed but please give Mike plenty of notice.

Finally, if you are a vegetarian, you need to be aware that the locals will consider you to be slightly mad and will feel very sorry that you are unable to enjoy their passion for delicious animal products of all kinds. Don't worry about this. Following several years of TTI activities, they are now used to us bringing curious foreigners to their restaurants and most are now able to supply vegetarian meals of some kind.

A FEW LOCAL RECOMMENDED RESTAURANTS

- Mulino Biologico (3280 707037, Fabbriche di Vallico)
- Da Sandra (0583 761289 on the road between Fabbriche di Vallico and Vallico Sotto).
- Il Canapale (0583 761829, Vallico Sopra)
- Al Laghetto (0583 75798, near the lake at the entrance to the Turrtecava valley)
- La Rondine (0583 761751 Fabbriche di Vallico, open Fri evening, plus all day Sat/Sun)
- Alto Matanna (0584 776005, Matanna)
- Ristorante Rita e Rinaldo (0583 357728, Focchia)

RESTAURANTS SLIGHTLY FURTHER AFIELD

- Circolo dei Forestieri, Bagni di Lucca
- Antica Trattoria dell'Eremita, Vergemoli
- Il Garfagnino, on the main road near Turrtecava.
- Quadrifoglio, on the main road near Calavorno.
- LOTS MORE - ASK

SPECIAL RESTAURANTS

- La Buca di Sant'Antonio, Lucca
- La Mora, Ponte a Moriano
- Butterfly, Lucca

See also the TTI Restaurant Guide page on the website.

14 CLEANING ROTA

Guests who have the misfortune to be members of the Cambridge University TCM Group and under the age of 40 are normally press-ganged into trying to keep the Institute clean:

Mike Towler - upstairs kitchen and corridor, upstairs bathroom, church
Pablo Lopez Rios - church, middle corridor, and front porch
Robert Lee - back garden, middle floor bathroom
Neil Drummond - downstairs living room , corridor and pantry, front garden
Alston Misquitta - downstairs kitchen
Priyanka Seth - downstairs kitchen

PLUS

Martin Krupicka (Mike's odd job and emergency response man - on account of his extreme competence).

Everyone else please try not to create too much mess for them.

15 TTI AMATEUR EVENING CONCERTS

I quote Professor Mitas :

PS. Suggestion. After the last year experience it seems that there was enough potential to organize small evening concerts just for us (amateur or professional). The violin is too difficult for me but I might practice recorder and if Andrea would accompany, some slower movements of Handel and Telemann sonatas might be doable. Others showed much greater talents, actually. I am sure Pablo could do some easier baroque (and other) guitar pieces, etc. The key is practicing in advance, at least a little bit.

The Institute has a high-quality antique violin (currently broken!), a modern electric violin, an electric piano, an acoustic guitar, a microphone and an amplifier. Please feel free to bring your own instruments.

16 CINEMA VALLICO

The requirements of modern science presentations means the Institute church is also the only cinema in the whole of the Apuan Alps - a fact that local people very much enjoy (since the opening presentation of *Cinema Paradiso* in August 2005). During the conference you are welcome to use the projectors and it is expected that movies will be shown on some evenings. The Institute has an extensive DVD library which you are welcome to browse. Feel free also to bring your own movies that you think we might enjoy.

17 NEWS FROM THE TOWLER INSTITUTE

MDT has taken to writing stories about events at the Institute and publishing them on his blog at the local Barga News website. See www.barganews.com and the "News from the Towler Institute" blog (or go to the TTI web site www.vallico.net/tti/tti.html and click on the relevant link in the left-hand column). So far these are mainly about cave explorations and similar adventures. However, Mike doesn't have a monopoly on this. If you wish to contribute your literary efforts then please send your stories about your adventures in Italy to him, and they will be published on the blog.

18 FOOTBALL MATCH: VALLICO SOTTO CONTRO IL MONDO

The thrusting young lads of Vallico Sotto have challenged the Rest of the World - i.e. you - to a game of 5-a-side football on the village pitch. This tradition - which we began a few years ago - attracts a large crowd and we always get absolutely caned (even when I have had Brazilians and Spanish people available). Can a small mountain village with less than a hundred inhabitants continue to defy the other

6 billion of us? If you think you can stop them, please volunteer.

Robert Lee
Mariapia Marchi
Michal Bajdich
Dario Alfe
Simone Taioli
Mike Towler
OTHERS TO BE CONFIRMED

19 SUMMER SCHOOL

Note that the conference will be followed by a QMC Summer School the following week, taught by Mike Towler, Neil Drummond, Pablo Lopez Rios and Robert Lee. Schedule available on the web site. Volunteers to help are absolutely welcome - particularly if you can drive.

20 HEALTH AND SAFETY

We should all recognise that climbing and mountaineering are activities with a danger of personal injury or death. Participants in these activities during their stay at TTI are asked to be aware of and accept these risks and be responsible for their own actions.

Vallico Sotto is a mediaeval village built a thousand years ago on a steep slope with many steps, and the facilities for the disabled are thus either completely disastrous or non-existent. However don't let this put you off; if we have to carry your wheelchair up the hill with you in it, then this can be arranged.

TTI is a smoking venue and visitors may smoke as much as they like (ashtrays will be provided).

21 APPENDIX 1 : Talk abstracts

Some people like to provide abstracts for their talks. The ones I have received are gathered here.

Claudio Amovilli

"Some applications of QMC to chemistry"

ABSTRACT: QMC is a promising alternative to standard quantum chemistry methodologies for the study of molecular processes. In this talk an example of a gas phase thermal reaction and a model for the solvation will be discussed.

Michal Bajdich

"Quantum Monte Carlo study of a model of spherical jellium with impurity and self-healing quantum Monte Carlo calculations of atoms and molecules."

ABSTRACT: We perform quantum Monte Carlo (QMC) calculations of the closed-shell spherical jellium spheres with up to 58 electrons for wide ranges of electronic densities ($1 \leq r_s \leq 5.62$). By employing the backflow correlation terms, we observe a systematic improvement when compared to previous fixed-node diffusion Monte Carlo (DMC) results^[1]. In order to

model the localization effects present in d and f electron compounds, we extend the spherical jellium model to include a positive Gaussian impurity of a tunable strength at the origin. For the fully filled 1d-shell with 18 electrons, we find that a boundaries between the three lowest lying states in the phase space diagram are well described at the GGA-DFT level when compared to QMC. Further, we study a half-filled 1f-shell with 27 electrons and jellium within the spherical shell.

The self-healing diffusion Monte Carlo algorithm (SHDMC) [Phys. Rev.B **79**, 195117 (2009), *\it ibid.* **80**, 125110 (2009)] is shown to be an accurate and robust method for calculating the ground state of atoms and molecules. By direct comparison with accurate configuration interaction results for the oxygen atom we show that SHDMC converges systematically towards the ground-state wave function. We present results for the challenging N₂ molecule, where the binding energies obtained via both energy minimization and SHDMC are near chemical accuracy (1 kcal/mol). Moreover, we demonstrate that SHDMC is robust enough to find the nodal surface for systems at least as large as C₂₀ starting from random coefficients. SHDMC is a linear-scaling method, in the degrees of freedom of the nodes, that systematically reduces the fermion sign problem.

[1] Sottile and Ballone, Phys. Rev. B, 64, 045105 , (2001).