GRADnet Video Conference PhD courses in January and February 2015

GRADnet offers a range of advanced Physics courses of relevance to Physics PhD students in the SEPnet partnership. Students may attend these courses either in person or over the SEPnet video conference facilities. Normally video conference facilities are available in the partner video-conference physical rooms. In case of clashes, or where students are away from their normal institution, desktop PC and laptop licenses are available for students to participate. Details of how to use the VC facilities, and PowerPoint presentations and other associated course materials, are posted on the SEPnet Virtual Research Environment: www.sepnet.ac.uk/vre .

The following courses start in January and February 2015. To participate in any of these courses either in person or by video conference please email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local GRADnet Administrator.

Further courses will start in March. Details of these will follow shortly. However, the current list for 2015 is available on the Virtual Research Environment.

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Algebraic Computing using Maple   Dr David Faux
                                                  Surrey

Target audience: Physics PhD students

Maple is a high-level algebraic computing package. During the 90 minutes videoconference session you will learn the basic commands that allow you to do simple algebraic computations. You will receive an overview of the most important features of Maple, its strengths and weaknesses. Participants who have Maple installed will be able to attempt problems in real time. The video-conferenced training session will be delivered by Dave Faux at the University of Surrey.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
12th Jan	Time	10:00-12:00				
	Virtual Room	SEPnet 6 - 55993735				
	Physical Room	Surrey 30BB03				

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

Working with workshops   Prof David Dunstan
                                                 QMUL

   Target audience: All Experimental PhD students

An introduction to the VRE workshops community that aims to provide practical support and practical skills for students developing equipment in collaboration with their University workshops.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
19th Jan	Time	10:00-12:00				
	Virtual Room	SEPnet 3 - 55993732				
	Physical Room	QMUL				

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

Theoretical Cosmology				Dr Bridget Falck Portsmouth		

Target audience: All Astro Physics PhD students

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
19th Jan	Time	14:00-16:30		14:00-16:30		14:00-16:30
	Virtual Room	SEPnet 2 – 55993731		SEPnet 2 – 55993731		SEPnet 2 – 55993731
	Physical Room	DS2.08		DS2.08		DS2.08

***To participate in this course by video conference*:** email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

Beyond the Standard Model/Supersymmetry(Extra dimensions/GUTS			Dr Stephen Huber Sussex		
Target audience: All Particle Physics PhD students					

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
19th Jan	Time			14:00-16:00		
	Virtual Room			SEPnet 7 – 55993736		
	Physical Room			Pevensy 3 L2		
And at the same time/location until 4th March 2015						

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

	QFT2			Dr Tim Morris Southampton		

Target audience: All Particle Physics PhD students

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
19th Jan	Time				10:00-11:00	10:00-12:00
	Virtual Room				Sepnet 5 – 5993734	Sepnet 5 – 5993734
	Physical Room				46/4121	46/4121

And at the same time/location until 19th February on Thursdays and 13th February 2015 on Fridays

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

| *Lasers in a Nutshell* | Dr Marco Peccianti |
| | Sussex |

Target audience: Experimental PhD students

The word LASER is an acronym which stands for Light Amplification by Stimulated Emission of Radiation. Originally, it was referring to a physical principle, but nowadays is widely used to describe the source of the laser-generated light. Lasers are now ubiquitous and cross-disciplinary. The discovery of Lasers radically changed the way we perceive the natural world, the way we build and design, the way we communicate. A video-conference training session focused on LASER physics and technology will be given by Dr Marco Peccianti at the University of Sussex.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
26th Jan	Time	10:00-12:00				
	Virtual Room	SEPnet 7 55993736				
	Physical Room	Pevensey 3 L2 Sussex				

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

	Maths Methods	Dr Hector Gil
		Portsmouth

Target audience: All PhD students

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
26th Jan	Time	14:00-16:30		14:00-16:30		14:00-16:30
	Virtual Room	SEPnet 2 – 55993731		SEPnet 2 – 55993731		SEPnet 2 – 55993731
	Physical Room	DS2.08		DS2.08		DS2.08

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

		MATLAB		Dr Detlef Mueller
				Herts

Target audience: All PhD students

MATLAB is a high-level technical computing language and interactive environment for algorithm development, data visualization, data analysis, and numerical computation. Using MATLAB, you can solve technical computing problems faster than with traditional programming languages, such as C, C++, and FORTRAN. Goal of this course is to get you started using MATLAB successfully and quickly. During the 90 minutes videoconference session you will learn the basic commands that allow you to do simple mathematical computations and visualize the results. You will receive an overview of the most important features of MATLAB which allows you to understand the concept of MATLAB, and why it is sometimes useful to use MATLAB rather than other programming languages. You will learn how to create small programs which is the starting point for writing more complex programs, similar to what is done in traditional software programming.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
2nd Feb	Time					14:00-16:30
	Virtual Room					SEPnet 8
						55999924
	Physical Room					LC109, Herts

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

| **Angular Momentum in Quantum Mechanics** | Prof Ron Johson |
| | Surrey |

Target audience: First Year Nuclear Physics PhD Students

This course describes the formalism used to handle the quantum mechanics of many-body systems in states of definite angular momentum with emphasis on applications in nuclear and atomic physics. 8 x 2 hour lecture/tutorial.

To provide students with the basic algebraic techniques used in the analysis of quantum systems in eigenstates with definite total angular momentum.

Course Content (summary):
State Vectors and operators. Quantum dynamics. Symmetry transformations. Geometrical symmetry. Rotation of a physical system. Active and passive points of view. Angular momentum operator as a generator of rotations. Commutation relations. Eigenvalue spectrum of angular momentum. Orbital angular momentum. Spherical Harmonics. Parity. Intrinsic spin. Spinors. Pauli spin matrices. Rotation of scalar, vector and spinor fields. Rotation of an operator. Vector operators. Euler angles and rotation matrices. Coupling of 2 angular momenta. Clebsch-Gordan Coefficients and 3-j symbols and their properties. Exchange symmetry of 2 particle states. Tensors and tensor operators. Irreducible tensor operators. Examples. Transition operators. Commutation relations. Products of tensors. Wigner-Eckart theorem and its applications. Selection rules. Coupling of several angular momenta. Racah, 6-j and 9-j symbols. Applications.

Recommended Reading:

1. Angular Momentum: DM Brink and GR Satchler, OUP.
Elementary Theory of Angular Momentum; ME Rose , Wiley.
Quantum Mechanics, ChXIII, A Messiah, North-Holland.
Quantum Theory of Angular Momentum, DA Varshalovich, AN Moskalev and VK Khersonskii, World Scientific.
Nuclear Shell Theory, A de-Shalit and I Talmi, AP.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
2nd Feb	Time		15:00-17:00			
	Virtual Room		SEPnet 6 - 55993735			
	Physical Room		Surrey 30BB03			

And at the same time/location on February 10, March 3, 10, 17, 24, 31 and April 14

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

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	Stats II		Dr Stephen Serjeant
			The Open University

Target audience: All

The second part of an introduction to the VRE statistics community that aims to provide practical support for students using statistics in their research. Stats 1 was transmitted on 27th October 2014.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
9th Feb	Time	10:00-11:00				
	Virtual Room	SEPnet 9 - 55999925				
	Physical Room	Open				

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

C++			Dr Fabrizio Salvatore			

Target audience: All PhD students

A C++ community for those beginning and looking for help with C++. Further details here.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
9th Feb	Time					14:00-16:30
	Virtual Room					SEPnet 7 – 55993736
	Physical Room					

And at the same time/location on Friday, 20th February and on Monday, 23rd February 10:00-1200

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator

	Student Discussions	Mark Thomas PhD Student contact Southampton
	Target audience: All PhD students	Please check the VRE for location and subject of discussion

A 1 hour, PhD student only, discussion of physics where students are free to discuss and ask each other questions which they may not feel comfortable asking in front of senior staff.

Each session will begin with a talk on a topic by one of the students (10-30 minutes) to stimulate discussion. Topics can be suggested by the students themselves either at the sessions or on this forum, and will aim to have some overlap between physics disciplines.

When and where

Week		Monday	Tuesday	Wednesday	Thursday	Friday
23rd Feb	Time Virtual Room					15:00-16:00 Check VRE for location
	Physical Room					

And at the same times on 27th March, 8th May, 22nd May and 5th June

To participate in this course by video conference: email your name, institution and the course title to gradnetadmin@sepnet.ac.uk as well as your local administrator