

8th Heidelberg Astronomy Summer School:

High-Energy Astrophysics

September 9th - 13th, 2013

organized by the

*International Max Planck Research School (IMPRS) for
Astronomy and Cosmic Physics at the University of Heidelberg*

Invited Lecturers: **John Kirk** (MPI for Nuclear Physics)
Malcolm Longair (Cambridge University)
Yuri Lyubarsky (Ben-Gurion University)

Assistents (practicals): Christoph Deil, Victor Zabalza

Location: Max Planck conference center (“Max-Planck-Haus”),
Gerhard-Hauptmann-Str. 36, 69120 Heidelberg, Germany

School program

Monday, September 9th, 2013

08:30 - 13:30 Registration
10:00 - 10:30 *Welcome address, organisational remarks (Stefan Wagner, Christian Fendt)*
10:30 - 11:30 *The Thermal and Non-thermal Universe (Malcolm Longair)*
11:30 - 12:30 *Interaction of high energy particles with matter and radiation (Malcolm Longair)*
12:30 - 14:30 Lunch
14:30 - 15:30 *Relativistic MHD: fields, forces, waves (Yuri Lyubarsky)*
15:30 - 16:00 Coffee break
16:00 - 17:00 *Radiative processes – classical treatment (Malcolm Longair)*
17:00 – 18:00 [Practicals: Download / installation of software & data](#)

Tuesday, September 10th, 2013

09:00 - 10:00 *Radiative processes - classical treatment, including quantum
corrections (Malcolm Longair)*
10:00 - 11:00 *MHD outflows:basics (Yuri Lyubarsky)*
11:00 - 11:30 Coffee break
11:30 – 12:30 *Applications & interpretation in different cosmic environments (Malcolm Longair)*
12:30 - 14:30 Lunch
14:30 - 15:30 *Dynamical processes and relativistic beaming (Malcolm Longair)*
15:30 - 16:00 Coffee break
16:00 - 17:30 [Practicals: Fermi data analysis](#)
17:30 - 22:00 BBQ / social dinner

Wednesday, September 11th, 2013

- 09:00 - 10:00 **Science talk: Ground-based gamma ray astronomy (Jim Hinton)**
- 10:00 - 11:00 *Pulsar winds and nebulae* (Yuri Lyubarsky)
- 11:00 - 11:30 Coffee break
- 11:30 - 12:30 *Charged particle kinematics, non-stochastic acceleration processes, acceleration at current sheets, shock-drift acceleration* (John Kirk)
- 12:30 - 13:30 Lunch
- 14:00 - 18:00 Excursion: Boat trip on the Neckar River

Thursday, September 12th, 2013

- 09:00 - 10:00 *Relativistic MHD jets: stability and dissipation* (Yuri Lyubarsky)
- 10:00 - 11:00 *Stochastic acceleration processes, magnetic pumping, 1st and 2nd order Fermi processes, acceleration by turbulence* (John Kirk)
- 10:30 - 11:00 Coffee break
- 11:30 - 12:30 *Relativistic MHD jets: collimation and acceleration* (Yuri Lyubarsky)
- 12:30 - 14:30 Lunch
- 14:30 - 15:30 **Science talk: Monte Carlo simulations of air showers and Cherenkov telescopes (Konrad Bernlöhner)**
- 15:30 - 16:00 Coffee break
- 16:00 - 19:00 **Practicals: Fermi data analysis**
- 20:00 - 23:00 Pub evening

Friday, September 13th, 2013

- 09:00 - 10:00 *Particle scattering and transport, MHD wave modes, resonance conditions* (John Kirk)
- 10:00 - 11:00 **Science talk: Multiwavelength observations in high energy astrophysics (Stefan Wagner)**
- 11:00 - 11:30 Coffee break
- 11:30 - 12:30 *Diffusive shock acceleration* (John Kirk)
- 12:30 - 14:30 Lunch
- 14:30 - 15:30 *Acceleration at relativistic shocks* (John Kirk)
- 15:30 - 16:30 Farewell, departure (Stefan Wagner, Christian Fendt)