

5th Heidelberg Astronomy Summer School:

First Stars & Cosmic Reionization

September 6th - 10th, 2010

organized by the

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

Invited Lecturers: Volker Bromm, Austin
Naoki Yoshida, Tokyo
Andrea Ferrara, Pisa
Saleem Zaroubi, Groningen

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

School program :

Monday, September 6th, 2010

- 10:30 - 14:00 *Registration & lunch*
- 14:00 – 14:05 *Welcome address* (Stefan Wagner)
- 14:05 – 14:15 *LOC announcements* (Christian Fendt)
- 14:15 – 15:00 *Structure formation in the early universe* (Naoki Yoshida)
- 15:00 - 15:30 *Coffee break*
- 15:30 – 16:30 *The intergalactic medium* (Andrea Ferrara)
- 16:30 – 17:30 *First galaxies – cosmological context & basic principles* (Volker Bromm)
- 17:30 – 18:30 *Questions & answers – discussion round*

Tuesday, September 7th, 2010

- 09:00 – 10:00 *Physics & chemistry of primordial star formation* (Naoki Yoshida)
- 10:00 – 11:00 *Feedback on cosmological scales I: Mechanical* (Andrea Ferrara)
- 11:00 - 11:30 *Coffee break*
- 11:30 – 12:30 *Assembly of the first galaxies* (Volker Bromm)
- 12:30 – 14:00 *Lunch*
- 14:00 – 14:30 *Cosmic large-scale structure & the fate of the first objects* (Volker Springel)
- 14:30 – 15:00 *Questions & answers – discussion round*
- 15:00 - 15:30 *Coffee break*
- 15:30 – 16:00 *AMR Simulations of First Star Formation* (Tom Abel)
- 16:00 – 16:30 *Primordial Magnetic Fields* (Dominik Schleicher)

16:30 – 17:30 *Lab exercises*

17:30 – 22:30 *Excursion: Tour at MPIA & LSW, BBQ @ LSW*

Wednesday, September 8th, 2010 (at the Old Auditorium of Heidelberg University)

09:00 – 10:00 Observational probes of reionization and how they currently constrain reionization (Saleem Zaroubi)

10:00 – 11:00 Simulating the formation of primordial stars (Naoki Yoshida)

11:00 - 11:30 *Water break*

11:30 – 12:30 Feedback on cosmological scales II: Radiative & chemical (Andrea Ferrara)

12:30 – 14:00 *Lunch*

14:00 – 17:30 *Excursion: Boat trip on the Neckar River*

Thursday, September 9th, 2010

09:00 – 10:00 Star formation inside the first galaxies - stellar archeology (Volker Bromm)

10:00 – 11:00 The 21cm transition physics in the context of reionization – spin temperature history (Saleem Zaroubi)

11:00 - 11:30 *Coffee break*

11:30 – 12:30 *Lab exercises*

12:30 – 14:00 *Lunch*

14:00 – 15:00 Reionization: theory & sources (Andrea Ferrara)

15:00 - 15:30 *Coffee break*

15:30 – 16:00 Chemical Processes in the Early Universe (Simon Glover)

16:00 – 16:30 Formation of the First Stars by Mass Accretion (Takashi Hosokawa)

16:30 – 17:30 Current & future 21 cm experiments (Saleem Zaroubi)

17:30 – 18:00 *Questions & answers* – discussion round

19:30 – 24:00 *Pub evening*

Friday, September 10th, 2010

09:00 – 10:00 Towards the formation of the first galaxies and black holes (Naoki Yoshida)

10:00 – 11:00 Signature of the first galaxies for JWST (Volker Bromm)

11:00 - 11:30 *Coffee break*

11:30 – 12:30 *Lab exercises*

12:30 – 14:00 *Lunch*

14:00 – 14:30 First Stellar Cluster (Paul Clark)

14:30 – 15:30 What could we learn from the expected data about the universe (Saleem Zaroubi)

15:30 – 15:40 *Farewell address* (Hans-Walter Rix)

15:40 – 17:00 *Departure*