Welcome to the 2nd LC School!

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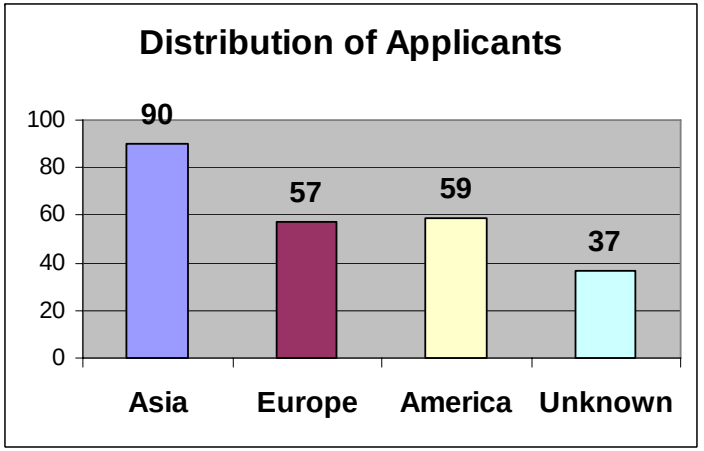
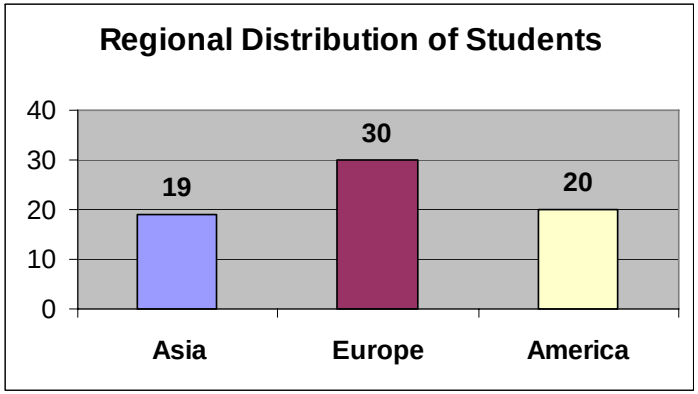
Why You are Here

- **This is a wonderland**
  - But you are not here for vacation
  - It is an ideal place for a school
- **Linear Collider needs you**
  - Linear Collider is the future of the world high-energy physics (HEP)
  - If we want to have a future, we must train a young generation now
- **You said you want to work on it**
- **Your supervisor said you are *very* good**

How You Were Selected

- The school received 243 applications from 31 countries
- Due to limited resources, only 69 students from 18 countries were accepted (several couldn't come due to personal reasons). In average only 1 out of 3 was admitted.
- Admission was "need blind" – no student should be turned away just because he/she can't afford it
- The committee members read every CV and recommendation letter before they made the decision if one should be selected or rejected





Program

Daily Schedule

Breakfast	08:00 – 09:00
Morning	09:00 – 12:30, including ½-hour break **(San Domenico)**
Lunch	12:30 – 14:30
Afternoon	14:30 – 18:00, including ½-hour break **(San Domenico)**
Tutorial & homework	18:30 – 21:00 **(San Francesco)**
Dinner	21:00 –

List of Courses

	Morning	Afternoon	Evening
October 1		*Arrival, registration*	*Reception*
October 2	Introduction	Sources & bunch compressors	Tutorial & homework
October 3	Damping ring I	Linac I	Tutorial & homework
October 4	Damping ring II	Linac II	Tutorial & homework
October 5	LLRF & high power RF	*Excursion*	Tutorial & homework
October 6	Superconducting RF I	Beam delivery & beam-beam	Tutorial & homework
October 7	Superconducting RF II	Instrumentation & control I	Tutorial & homework
October 8	Instrumentation & control II; Operations	CLIC	Tutorial & homework
October 9	*Final exam*	Conventional facilities; Physics & detectors	*Banquet* *Student Award Ceremony*
October 10	*Departure*		

Program (cont…)

	Tuesday, October 2	Wednesday, October 3	Thursday, October 4	Friday, October 5
Morning 09:00 – 12:30	**Opening remarks** (10) **Lecture 1 – Introduction** (180) **Nick Walker** (DESY) • Why LC • What's ILC • Layout of ILC • Parameter choices & optimization • Overview of accelerator issues	**Lecture 3 – Damping ring I** (180) **Andy Wolski** (Univ. of Liverpool) • Role of damping rings • High-level overview of structure, and principles of operation • Review of basic linear beam dynamics • Damping ring lattice • Radiation damping (derivation of damping times, and the need for a damping wiggler in LC damping rings) • Quantum excitation and equilibrium beam emittances	**Lecture 3 – Damping ring II** (180) **Andy Wolski** (Univ. of Liverpool) • Brief overview of technical systems • R&D challenges for selected technical components ➢ injection/extraction kickers ➢ damping wiggler • Brief overview of beam dynamics issues • Selected beam dynamics issues ➢ impedance effects ➢ electron cloud effects	**Lecture 5 – LLRF & high power RF** (180) **Stefan Simrock** (DESY) • RF system overview • LLRF • Timing and synchronization • Modulators • Klystrons • RF distribution
Afternoon 14:30 – 18:00	**Lecture 2 – Sources & bunch compressors** (180) **Masao Kuriki** (KEK) • e- gun • e+ sources • Polarized sources • Bunch compressors • Spin rotator	**Lecture 4 – Linac I** (180) **Peter Tenenbaum** (SLAC) • Tutorials of linac basics • Standing wave linacs and structures • SRF parameter constraints • Beam loading and coupling • Lorentz force detuning	**Lecture 4 – Linac II** (180) **Peter Tenenbaum** (SLAC) • Linac lattice • Emittance preservation • RF field stability • Wakefield and dampers • HOMs • Alignment issues • Vibration issues • Beam based alignment	**Excursion to Segesta** **(Bus leaving Porta Trapani at 14:00)**
Evening 18:30 – 21:00	Tutorial & homework	Tutorial & homework	Tutorial & homework	Tutorial & homework

Program (cont…)

	Saturday, October 6	Sunday, October 7	Monday, October 8	Tuesday, October 9
Morning 09:00 – 12:30	**Lecture 6 – Superconducting RF I** (180) **Kenji Saito** (KEK) • Superconductivity basics • SRF specifics and constraints • Cavity design • Cryogenics • ILC cryomodules	**Lecture 6 – Superconducting RF II** (180) **Kenji Saito** (KEK) • Material issues • Cavity fabrication and tuning • Surface preparation • Gradient limit and spread • Power Coupler • HOM Couplers • Slow and fast tuner • ILC design	**Lecture 8 – Instrumentation & control II** (90) **Marc Ross** (Fermilab) • Electronics • Data processing **Lecture 9 – Operations** (90) **Marc Ross** (Fermilab) • Reliability • Availability • Remote control and global network	**08:00 – 12:30 Final exam** (270)
Afternoon 14:30 – 18:00	**Lecture 7 – Beam delivery & beam-beam** (180) **Andrei Seryi** (SLAC) • Overview • Beam-beam interaction and crossing angle • Collimation • Accelerator-detector interface, shielding and beam dump • Background and detector protection • Beam monitoring and control at final focus	**Lecture 8 – – Instrumentation & control I** (180) **Marc Ross** (Fermilab) • Beam monitoring • Precision instrumentation • Feedback systems • Energy stability • Orbit control	**Lecture 10 – CLIC** (90) **Frank Tecker** (CERN) • Room temperature RF cavities • CLIC design • Differences between CLIC and ILC • Challenges to CLIC **Study time** (90)	**Lecture 11 – Conventional facilities** (90) **Atsushi Enomoto** (KEK) • Overview • Tunneling • Site requirement **Lecture 12 – Physics & detectors** (90) **Jim Brau** (Univ. of Oregon) • Tera scale physics • Physics beyond 1 TeV • ILC vs. LHC • Detectors
Evening 18:30 – 21:00	Tutorial & homework	Tutorial & homework	Tutorial & homework	19:00 Banquet at Restaurant Elimo Student Award Ceremony

Lectures, Homework and Exam

- All lectures are in seminar style, no text books.
- Latest version of the lectures is available on the web.
- There are homework assignments. But they will not be graded.
- Each lecturer will be available for one evening during the tutorial and homework time.
- There will be a final exam on Oct 9. Some of the exam problems are similar to those in the homework, some are new.
- Based on the exam grade, the curriculum committee will select top 10 students and have an award ceremony on October 9.

8 Characteristics of a Good School

1. High expectations for every student
   - Learn as much as you can
   - Make as many new friends as you can

   (Will randomly organized small study groups help?)
2. Community support
3. A rigorous curriculum and fair assessments
4. Sufficient resources to help all students achieve
5. Safe, healthy and supportive learning environments
6. Classrooms equipped for teaching and learning
7. Qualified teachers in classrooms
8. Strong school leadership