Accelerator Physics Course – Intro

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Introductions and Outline

- General Introduction: Lecturers and Students
- Syllabus: Weeks 1 - 4
- Lectures, Practicum and Exams: 10 AM - 1 PM (CST*)

  * CST (Central Standard Time) = GMT (Greenwich Mean Time) - 6 hours
- Homework Sessions: 6 PM - 8 PM (CST)
- Homework
  - Two assignments per week – Assigned on: Tue and Thu at 1 PM (CST)
  - Due by: Thu and Mon 10 AM (CST)
- Lecturers: Geoff (GK), Alex (AB), Suba (SDS), Isurumali (IN)

Syllabus – Week 1

- Mon 1/24, Lecture 1: **'Relativity, EM Forces - Historical Intro'** (AB)
- Tue 1/25, Lecture 2: **'Weak Focusing and Transverse Stability'** (GK)
- Wed 1/26, Lecture 3: **'Linear Optics'** (GK)
- Thu 1/27, Lecture 4: **'Phase Stability, Synchrotron Motion'** (AB)
- Fri 1/28, Practicum: **'FODO Lattice Design'** (IN)

Due by Mon 1/31, 10 AM (CST)

Syllabus – Week 2

- Mon 1/31, Lecture 5: **'Magnetic Multipoles, Magnet Design'** (AB)
- Tue 2/1, Lecture 6: **'Synchrotron Radiation'** (GK)
- Wed 2/2, Lecture 7: **'Coupled Betatron Motion'** (AB)
- Thu 2/3, Lecture 8: **'Radiation Distributions'** (GK)
- Fri 2/4, **Mid Term Exam**

Syllabus – Week 3

- Mon 2/7, Lecture 9: **'X-ray Sources/FELs'** (GK)
- Tue 2/8, Lecture 10: **'Fundamentals of RF Cavities'** (SDS)
- Wed 2/9, Lecture 11: **'Beam Dynamics of Energy Recovery Linacs'** (AB)
- Thu 2/10, Lecture 12: **'Radiation Damping'** (AB)
- Fri 2/11, Lecture 13: **'Particle Acceleration'** (GK)

Syllabus – Week 4

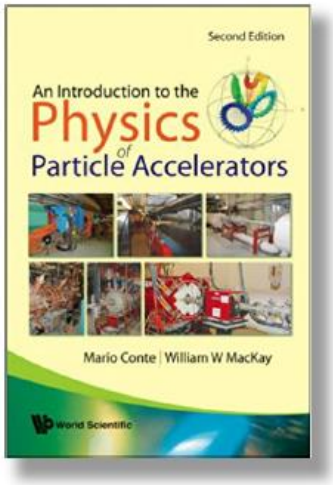
- Mon 2/14, Lecture 14: **'Low Emittance Lattices'** (AB)
- Tue 2/15, Lecture: 15 **'Statistical Effects - I'** (GK)
- Wed 2/16, Lecture 16: **'Statistical Effects - II'** (GK)
- Thu 2/17, **Recitation Session**
- Fri 2/18, **Final Exam**

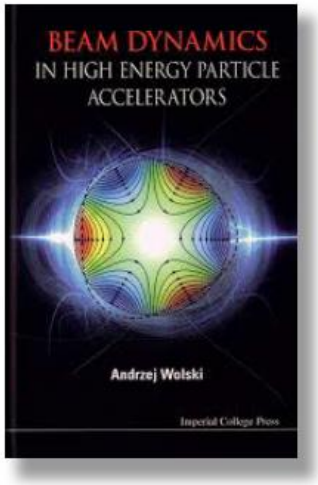
Homework and Grades

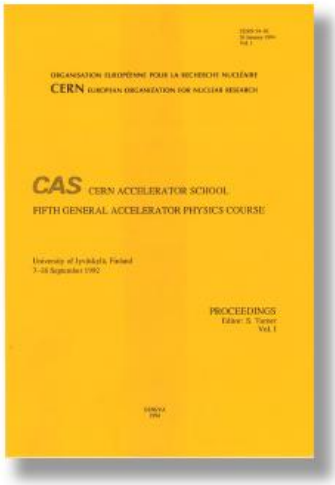
- Homework is close to 1/3 of your grade (**30**%)
  - Isurumali and Suba are grading
- Practicum (**10**%)
- Exams: Mid Term (**20**%) and Final (**40**%)
  - Mid-term Exam (Friday, February 4)
  - Final Exam (Friday, February 18)

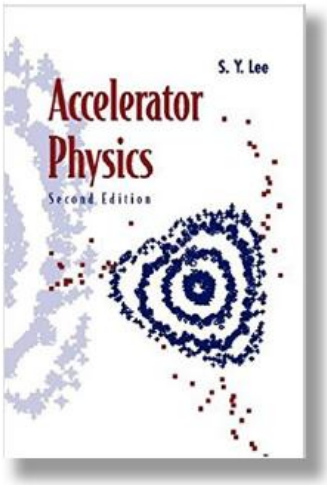
Some References

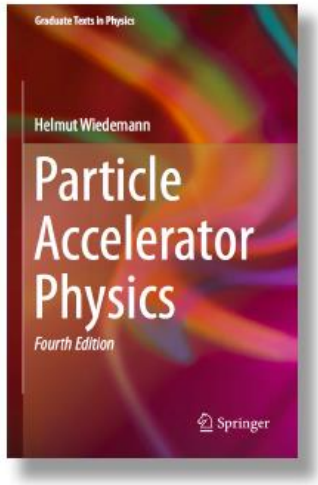
1. Mario Conte, William W. MacKay, *An Introduction to the Physics of Particle Accelerators*, Second Edition, World Scientific, 2008
2. Andrzej Wolski, *Beam Dynamics in High Energy Particle Accelerators*, Imperial College Press, 2014
3. *The CERN Accelerator School (CAS) Proceedings*, e.g. 1992, Jyväskylä, Finland; or 2013, Trondheim, Norway
4. Shyh-Yuan Lee, *Accelerator Physics*, World Scientific, 2004
5. Helmut Wiedemann, *Particle Accelerator Physics*, Springer, 4th Edition, 2015











Whiteboard