2008 Michigan Quantum Summer School

Historical introduction

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- The spirit of the early Michigan Summer Symposia in Theoretical Physics now continues as a joint effort by
  - -the Michigan Center for Theoretical Physics,
  - -the Michigan Quantum Institute
  - -the FOCUS Physics Frontier Center
  - -the Joint Quantum Institute of U Maryland and NIST
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Michigan Summer Symposia

- In the early 1920's UM had strong experimental programs with a dozen faculty in nuclear physics, x-rays, atomic & molecular (particularly infrared) spectroscopy.
- However, Walter Colby was the only theorist conversant with modern problems Remedies taken:

  1923 Oskar Klein comes.
  1923-27 Summer lecture program runs

- Speakers include KT Compton, FA Saunders, Karl Herzfeld, W. L. Bragg, E A Milne, Harvey Fletcher. …
  This program is well received,
- but
- Subcritical mass of theorists led Klein to return to Europe 1925.

Michigan response to loss of Klein

Recruit four young, highly-accomplished theorists:
in 1926 Laporte (dipole selection rule),
in 1927 Goudsmit, Uhlenbeck (electron spin),
and also in 1927 Dennison (proton spin).

Start the Michigan Summer Symposia:
In 1928 Michigan began an ambitious summer program to give ambitious physicists from the entire country an extended opportunity to engage the best minds of the day.

These Symposia ran at full strength from 1928 to 1941.
Typical attendance on the order of 100 physicists,
(60% graduate students and 40% posdoctoral scholars).

Sample of visiting lecturers (extended stays) with frequency of their appearance, 1928-1941

Bethe	xx
Bloch	x
Breit	xxx
Brioullin	x
Condon	xx
Dirac	x
Ehrenfest	x
Fermi	xxxxx
Heisenberg	x
Kramers	xx
Lawrence	xx
London	x
Pauli	xx
Rabi	x
Schwinger	x
Seitz	xx
Sommerfeld	x
VanVleck	x
Wheeler	x
Wigner	x
Weisskopf	x

1931 courses

Sommerfeld	Electron Theory of Metals (4 weeks)
Sommerfeld	Problems of Wave Mechanics (4 weeks)
Pauli	Nuclear Physics (4 weeks)
Pauli	Quantum Theory of Equilibrium (4 weeks)
Kramers	Quantum Mechanics and Classical Models
Oppenheimer	Quantum Theory of Transitions
Uhlenbeck	Probability in Physics
Laporte	Theory of Atomic Spectra

1933 courses

Bohr	Foundations of quantum mechanics
Fermi	Structure of the atomic nucleus
Van Vleck	Atomic Magnetism
Goudsmit	Atomic Spectra
Uhlenbeck	Quantum Mechanics
Dennison	Molecular Band Spectra

1941 courses

Pauli	Recent Field Theories
Seitz	Theory of Solids (five weeks)
Schwinger	Nuclear Forces (four weeks)
Weisskopf	Nuclear Reactions (two weeks)

Circumstances for Symposium success 1928-1941

- Exciting physics with solid basis for theoretical analysis
- The migration of refugee scientists from Europe
- Strength of personal relationships in pre-WWII physics community
- Ann Arbor locale (tradition, climate, …)
- also
- Economics : not much summer research funding.
- Modest expectations of symposium attendees.(lodgingi, etc)
- Absence of competing conferences.

Symposia after 1946

- The Michigan Symposia did continue for several years after WWII, but it was difficult to maintain the earlier spirit and method. (exception: 1950 symposium on quantum electrodynamics when Schwinger lectured, Dyson explained.)
- Physics was in a rapid period of growth and the needs of the physics community had changed. There were many demands on the time of its practioners. Competing conferences were started.
- After 1950 the Michigan money available for symposium support tended to be used for smaller and shorter gatherings that focused on more specialized problems [nuclear structure, optical pumping, non-linear phenomena..]

The recent past

- Over the past decade, MCTP, FOCUS, and other intra-campus and intercampus research groups have organized conferences, workshops, and more extended gatherings to further the progress of research in physics and related disciplines. .
- This 2008 Michigan Quantum Summer School is perhaps the most ambitious of these efforts.

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- We open the Michigan Quantum Summer School so that you enjoy the opportunities to learn new material and to explore creative ideas in an atmosphere that is both collegiate and collegial.
- Welcome to Ann Arbor