



LUNDS
UNIVERSITET

Institutionen för teoretisk fysik

Forskarutbildningskurs i teoretisk
fysik: *Partikelfysikfenomenologi*
(*Particle Physics Phenomenology*) 5p

Antagen av institutionsstyrelse 2004-03-26

Förkunskaper (Prerequisites):

No formal demands for persons carrying out postgraduate studies in particle physics. However, some acquaintance with quantum field theory and particle physics (at about the level of the FYS230 undergraduate course in Theoretical Particle Physics) is assumed.

Syfte (Goal):

To familiarize the student with our current understanding of the relationship between the theoretical description of high energy physics, on the one hand, and the experimental reality, on the other.

Innehåll (Content):

The course is intended to give 5p and covers the following main topics:

- the matrix-element description of hard processes;
- final-state cascades;
- fragmentation models and multiparticle production data;
- parton distributions and initial-state cascades;
- “minimum-bias” physics including total cross sections, multiple interactions etc. in pp, gamma-p and gamma-gamma;
- electroweak and "new physics" processes, at current and future accelerators;
- measures of event properties;

- Monte Carlo methods and a survey of existing event generators.

The main areas are e^+e^- , ep and pp physics e.g. at LEP, HERA and LHC. The emphasis is on QCD aspects, but also spans to scenarios for physics beyond the standard model. Minor variations can be made to cover topics of current interest, or to reflect the research projects of the participating students.

Kurslitteratur (Course Literature):

Lecture notes distributed during the course or upon request.

In part the course overlaps with the contents of R.K. Ellis, W.J. Stirling and B.R. Webber, QCD and Collider Physics (Cambridge University Press, 1996)

Examination:

Examination by agreement with the examiner, normally consisting of hand-in exercises and an oral examination. Grades are Passed and Failed.

Handledare: Torbjörn Sjöstrand