

## The E166 experiment: Development of a polarized positron source for the ILC.

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The full exploitation of the physics potential of an International Linear Collider (ILC), will require the development of polarized positron beams. Having both positron and electron beams polarized will be a decisive improvement for many physics studies in the linear collider, providing new insight into structures of couplings and thus access to the physics beyond the standard model. The concepts discussed for a polarized positron source are based on circularly polarized photon sources. Those photons are then converted in a relatively thin target to generate longitudinally polarized positrons and electrons. Two different approaches have been developed to test for the first time a polarized positron source. While in an experiment at KEK a Compton back scattering is used, the E166 experiment uses a one meter long helical undulator in a 46.6 GeV electron beam to produce MeV photons with a high degree of circular polarization at 8.3 MeV. Beside the development of the helical undulator, the most challenging part in E166 is to measure the positron polarization using Compton transmission polarimetry. The expected asymmetries for both photons and positrons are about 3.4% and 1% respectively. The E166 experiment had two successful run periods in June and September 2005. The data analysis shows an asymmetry in the expected range for both photons and positrons. With this experimental confirmation, the helical undulator method became a preferred candidate for an ILC polarized positron source.

**Primary author:** LAIHEM, Karim (Institut fuer Hochenergiephysik Zeuthen)

**Co-author:** E166, Collaboration (E166)

**Presenter:** LAIHEM, Karim (Institut fuer Hochenergiephysik Zeuthen)

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