# DEPFET,
# a monolithic active pixel sensor for the ILC

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For the detection of secondary vertices of long lived particles containing bottom and charm quarks at the International Linear Collider (ILC), a DEPFET pixel detector is one of the technologically favored options. In a DEPFET sensor a MOSFET is integrated on a sidewards depleted p-on-n silicon detector, therefore combining the advantages of a fully depleted silicon sensor with in-pixel amplification.
Many of the ILC requirements have already been addressed. For instance, the radiation tolerance against ionizing radiation of the DEPFET has already been demonstrated. The required thinning of the device from 450 $\mu m$ down to 50 $\mu m$ has been successfully performed on test structures. The estimated power consumption is below 5 Watt, so no active cooling is required.
450 $\mu m$ thick prototype DEPFET modules have been tested in the laboratory and in a 6 GeV positron testbeam. The devices displayed a S/N$\geq$110, an efficiency of >99.95% at a purity of $\approx$100%. The position resolution is demonstrated to be significantly better than 5 $\mu m$. Also angular scans have been performed.
In the laboratory, the zero-suppressed readout capability of the DEPFET system was demonstrated. This will be tested in more detail during a testbeam at CERN this summer.
Next to the R&D on the device, a large (phsyics) simulation study is underway. The correspondence between the testbeam results and the device simulation is excellent. The simulation yields an impact parameter resolution, parametrized by $\sigma = a \otimes b/p_T sin^{3/2}\theta$, at the ILC in a 3T magnetic field with $a$=2.4 $\mu m$ and $b$=7.2 $\mu m GeV/c$.
The DEPFET program is in full swing. Many very promising intermediate results will be presented.