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New Measurement of Lorentz angles for electrons and holes in silicon detectors

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Silicon sensors are commonly used in particle trackers because of their stability and high spatial resolution in the um range. Inside a strong magnetic field the ionization is not entering on the electrode hit by the particle, but shifted to neighboring electrodes because of the Lorentz force in crossed E and B fields, which lets the ionization drift under a certain angle. This Lorentz angle is typically a few degrees for holes and a few tens of degrees for electrons in a 4T magnetic field, so it clearly has to be taken into account in typical experiments. The Lorentz angle depends on bias voltage, depletion voltage, temperature, magnetic field and radiation damage.
The Lorentz angle has been measured and parametrized for a large range of voltages (0-1000V), magnetic fields (0-8T), temperatures (126-293K) and fluences (0-10^16 n/cm2). The measurements were performed by inducing ionization with lasers and observing the position of the collected charge as function of the magnetic field. Preliminary data are presented.

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