

The GigaTrackKer: A high time resolution pixel detector for the NA62 experiment

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NA62 is a fixed target experiment at the CERN SPS aiming to measure the branching fraction of the decay of the positive kaon to a positive pion with a neutrino-antineutrino pair. Current estimates place this at about 10^{-10} . The experiment aims to collect 100 such events over its lifetime, providing an important test of the standard model.

The GigaTrackKer (GTK) is a silicon hybrid pixel detector comprising 3 stations placed early in the beam line, tasked with providing trajectory and timing information to the experiment. The design parameters are extremely challenging, requiring better than 200 ps (RMS) track resolution with an instantaneous beam rate of about 750 MHz, and a material budget of less than 0.5% X_0 per station. A novel cooling system based on micro-channels etched in silicon has been implemented to provide sufficient cooling capacity, whilst meeting the material budget.

I will briefly introduce the experiment, but will focus mainly on the GTK detector architecture, design and performance both in the laboratory and in the experiment.