

11th Beam Telescopes and Test Beams Workshop



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Test-Beam Instrumentation and Results of the RD50-MPW3 HV-CMOS Detector

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The CERN RD50 collaboration developed several radiation-hard monolithic silicon particle detectors (DMAPS) to study their usability for tracking and vertexing. The most recent development is the so-called *RD50-MPW3*.

This sensor was fabricated in a 150nm High Voltage CMOS process by *LFoundry* and consists of 64×64 pixel with a pitch of $62\mu\text{m}$. Besides an analog front end, the chip comprises a full digital readout and control unit. The detector was delivered in Sep. 2022 and has been under evaluation since then.

To study the performance of this detector in terms of spatial resolution, cluster-size distribution, efficiency, and general tracking capabilities, beam tests (at *CERN-SPS* and the Austrian medical facility *MedAustron*) have been performed.

For these tests, the chip utilized the *Caribou-DAQ* system and got integrated into the well-established frameworks *Peary* and *EUDAQ*. The test beam analysis is performed with the *Corryvreckan* framework. The DAQ system uses the *AIDA-TLU* for synchronization purposes with a beam telescope.

In this talk, I will present some of the implementation details of the DAQ system, like the (timestamped) synchronization concept and the 1Gbit/s UDP data collector. Furthermore, I will discuss several encountered problems and present the gathered test-beam results.

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