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The new monolithic ASIC of the preshower detector for di-photon measurements in the FASER experiment at CERN

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FASER, the ForwArd Search ExpeRiment, is an experiment at the LHC designed to search for light dark matter particles and study the interactions of high-energy neutrinos. A new high-granularity preshower detector will be installed in FASER with the purpose of measuring and discriminating electromagnetic showers generated by two photons with $\mathcal{O}$(TeV) energies. The new preshower will consist of six planes of monolithic silicon pixel detectors in 130 nm SiGe BiCMOS technology, with hexagonal pixels. The ASIC will integrate SiGe HBT-based fast front-end electronics, and will feature an extended dynamic range for the charge measurement. The detector will act as an imaging device for the electromagnetic showers: analog memories will store the charge information for thousands of pixels per event. The preshower detector will be installed in December 2024, taking data until the end of Run 3 of the LHC. This presentation will provide an overview of the project, focusing on the development of the final production ASIC with data from the first test.

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