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Different applications of Low Gain Avalanche Detectors

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The rising demand for fast particle detectors able to handle the increasing luminosity in High Energy Physics (HEP) experiments has led to the development of a new family of silicon detectors, namely Low Gain Avalanche Detectors (LGADs). Due to their low material budget and excellent 4D-tracking capabilities, i.e. the simultaneous measurement of the particle's position and time with high spatial (>=10µm) and time (>=30ps) resolution, the application of LGADs is not only limited to HEP, e.g. as in-beam monitors or tracking detectors but they can also be used for medical
applications, such as ion imaging.

Within this contribution, we will present several use-cases of LGAD strip sensors, which were produced at Fondazione Bruno Kessler (FBK). This includes the reaction time (T0) detector for the High Acceptance Di-Electron Spectrometer (HADES) at GSI in Darmstadt, Germany, a beam-structure monitor for the Superconducting Darmstadt LINear Accelerator (S-DLINAC) at the Technische Universität Darmstadt and an ion imaging experiment conducted at the MedAustron cancer therapy and research centre in Wiener Neustadt, Austria.

After discussing first results, we will outline planned upgrades of the current systems and possible future projects at the GSI and FAIR facilities.

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