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Beam profile measurements based on modern vertex detectors and beam-gas interactions

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A novel, non-disruptive technique to measure transverse beam shapes was recently demonstrated by the LHCb experiment at the Large Hadron Collider (LHC).
The technique is based on the detection of beam-gas interaction vertices with a tracking detector and was used in LHCb to obtain a 1.4% precision on the luminosity calibration.
A new device, the Beam-Gas Vertex (BGV) system, is now under development to perform dedicated beam size measurements at the LHC at any beam energy and intensity.
This technique could be applied to other particle accelerators.
The BGV tracking detectors will be based on scintillating fibre modules read out by silicon photomultipliers. These modules are very similar in performance requirements and environmental constraints to the fibre tracker modules of the LHCb Upgrade and are therefore developed in close cooperation.
The design studies, selected R&D results and the expected performance of the BGV demonstrator system will be presented.

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