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Scintillating Fibres for High Resolution Time Measurement?

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Scintillating fibres coupled to silicon photomultipliers (SiPM) provide the unique combination of excellent time measurement of sub-nanoseconds, concurrently minimizing the material budget below one percent radiation length and high segmentation.

Available state of the art technologies of fibres, such as different core materials, claddings, shapes and dimensions, along with their coupling to different SiPMs, mainly single sensors and arrays, are discussed.
On the example of the scintillating fibre sub-detector of the Mu3e experiment, advantages and disadvantages, areas of applications and possible readout solutions are presented.

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