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muCool: Development of ultra-cold high-brightness muon beam line

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At the Paul Scherer Institute, we are developing a novel positive muon beam at low energy with high brightness by compressing the 6-dimensional phase space of a standard surface muon beam.

Muons are stopped in a helium gas target with a density gradient at cryogenic temperature and compressed by making use of complex-shaped B- and E-fields. Compression stages that act along two different (transverse and longitudinal) directions have been developed and tested individually. As a next step we combine both compression stages into a single stage with mixed longitudinal-transverse compression. The feasibility of this mixed scheme has been successfully demonstrated.

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