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# The SIS100 laser cooling pilot facility

The heavy-ion synchrotron SIS100 will be at the *heart* of the future Facility for Antiproton and Ion Research (FAIR) in Darmstadt, Germany. This impressive new machine, with a circumference of 1084 m, will provide very high intensities of ultra-relativistic heavy-ions. Experiments would benefit from a beam cooling method, because it would improve the ion beam properties, such as the momentum spread and the emittance. Laser cooling is a very promising method because the laser cooling force increases strongly with  $\gamma$ , and cooling times could be below a second. Many different ion species could be addressed by state-of-the-art laser systems due to the relativistic Doppler-shift of the laser wavelength, as seen by the counter-propagating ions. It is planned to extract the laser-cooled ion beams from the SIS100 and uniquely deliver very cold and very short ultra-relativistic ion bunches to experiments. Furthermore, at high  $\gamma$ -values, the fluorescence from the laser-excited ions is emitted in a strongly forward-peaked cone, which supports accurate laser spectroscopy of atomic transitions (SPARC@FAIR). We will report on the progress of the project.

**Primary author:** Dr WINTERS, Danyal (GSI)

**Presenter:** Dr WINTERS, Danyal (GSI)

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