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High Power UV Laser Systems for Cooling Relativistic Bunched Ions

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Bunched relativistic ion beams with a narrow momentum distribution are essential for precision experiments at modern accelerator facilities. Laser cooling presents a promising approach to further reduce the relative momentum distribution of such ion beams.

This work presents the two high power UV laser systems, one pulsed and one cw, for laser cooling of relativistic bunched ion beams at the SIS100 at FAIR.
The cw system is optimized for high output powers with about 25 W in the green and 2.8 W in the UV even with long term operation due to an elliptical focus in the BBO crystal.
The pulsed laser is tunable over 3.4 THz in the UV with a dual BBO setup to improve conversion and beam displacement during frequency tuning.
Both laser systems ensure reliable and flexible operation for the laser cooling at the SIS100.

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