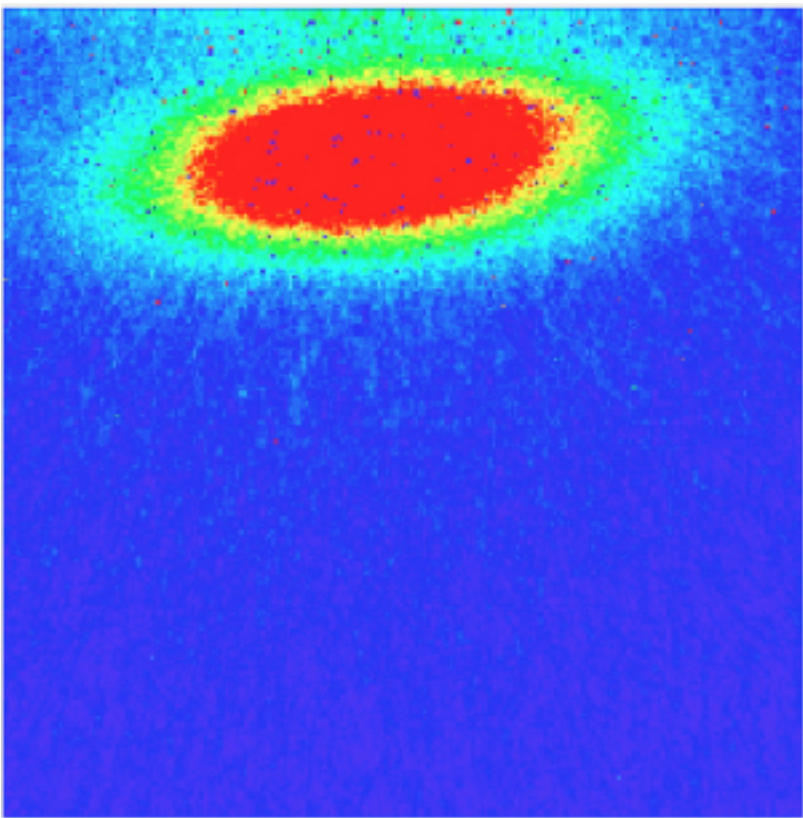


## UA9 Experiment



The UA9 experiment intends to assess the possibility of using bent silicon crystals as primary collimators to direct the beam halo onto the secondary absorber thus reducing out scattering, beam losses in critical regions and radiation load.

The experiment will be performed in the SPS LSS5 straight section in storage mode with a low intensity proton beam. The beam will be perturbed to create a diffusive halo as already tested with the RD22 experiment. The experiment will consist of 4 stations :

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The *crystal station* with two goniometers for a multi and a single crystal setup. This station will also house a counting detector on a linear movement inside the same vacuum tank of the goniometers.

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The *first tracking station* located at a phase difference of around  $90^\circ$  with tracking detectors for single particle tracking on the channeling and on the volume reflection side.

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The *second tracking station* with the same kind of detectors for tracking in the same two directions and with a beam monitor on the vertical side; the two stations will allow to measure  $x$ - $x'$  densities and collimation efficiencies with high precision.

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The *TAL station* with the tungsten secondary collimator and a counting detector.

The observables of the experiment are the collimation efficiencies, the measurement of the phase space and of the cleaning efficiency through the losses along the ring.

The deliverables are :

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The study of a two-stage crystal collimation with the possibility of tracking each single particle with high resolution trackers.

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The measurement of the cleaning efficiency of each crystal effect (channeling and volume reflection)

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The study of the behavior of a multi-crystal system in order to exploit volume reflection for collimation (which has a higher angular acceptance and a higher deflection efficiency with respect to channeling).

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The investigation of the multi-turn effect

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The development of a highly reliable setup on the SPS ring (consisting of the goniometers in vacuum and the roman pots with single particle tracking detectors) that will allow the test of collimation with crystals, of crystals manufactured with different materials and the possibility of validating simulation and Monte Carlo codes.