

# Intensity and bunch-shape dependent beam loss simulation for the SIS100

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## **Abstract**

We have studied the combined influence of magnet nonlinearities, space charge and bunch shapes consistent with different RF scenarios on the long-term loss in the planned SIS100 synchrotron of the FAIR project. The simulation is a 3D tracking with "frozen-in" space charge calculation employing the MICROMAP code. Comparing an oneharmonic RF scenario with an alternative double-harmonic scenario we find that for the same absolute beam loss roughly twice the number of particles can be stored in the double-RF system. Moreover, a barrier bucket RF scenario is found to be loss-free. This is due to the fact that loss is caused here by space-charge induced periodic resonance crossing, which is absent for the strictly flat bunch profile of the barrier case.



Figure 1: FAIR project and SIS100.