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MAIUS-1 - CREATING THE FIRST BOSE-EINSTEIN CONDENSATE IN SPACE

Abstract

On its maiden flight on Jan 23, 2017 the MAIUS-1 mission was able to demonstrate the first creation of a Bose-Einstein Condensate in space. During about 360 s of microgravity, around 100 experiments were carried out to characterize the behaviour of the condensate and its usability for atom interferometry in this environment. To achieve these goals in the limited timeframe of a sounding rocket flight, the payload was equipped with an autonomous control system. The system was designed to optimize the experiment and decide on the next experimental sequences based on environmental conditions and previous experimental results. This includes an image evaluation algorithm and a model-based description of the experimental sequences available.

In this talk, we will give an overview of the scientific results, and a detailed description of hardware and software of the control system.