

Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Towards BEC-borne two-species atom interferometry in space¹

MAIKE DIANA LACHMANN, BAPTIST PIEST, DENNIS BECKER, WOLFGANG ERTMER, ERNST M. RASEL, Leibniz-Universitt Hannover, QUANTUS COLLABORATION², MAIUS TEAM — Tests of the universality of free fall using two-species atom interferometers in space are currently of large interest. By increasing the free evolution time in the interferometer due to the microgravity environment the sensitivity can be enhanced significantly. After the successful launch of the MAIUS-1 mission and the first demonstration of Bose-Einstein condensation in space we aim for two-species atom interferometers on the sounding rocket missions MAIUS-2 and -3. The new system contains, in addition to Rb-87, K-41 as a second species. It is planned to study mixtures as well as sequential and simultaneous interferometry using Raman beam splitters. One goal is to extend the free fall time during the interferometer to timescales that are not possible on ground. For this features like an optical dipole trap will be implemented. The developed technology and the studies on ground and during flight support future space missions with several applications. The poster will show the mission goals, the setup and the current progress on ground.

¹This research is funded by DLR under grant 50WP1435.

²LU Hannover, HU Berlin, JGU Mainz, ZARM Bremen, DLR-RY, DLR-SC, FBH Berlin, U Ulm, TU Darmstadt

Maike Diana Lachmann
Leibniz-Universitt Hannover

Date submitted: 26 Jan 2018

Electronic form version 1.4