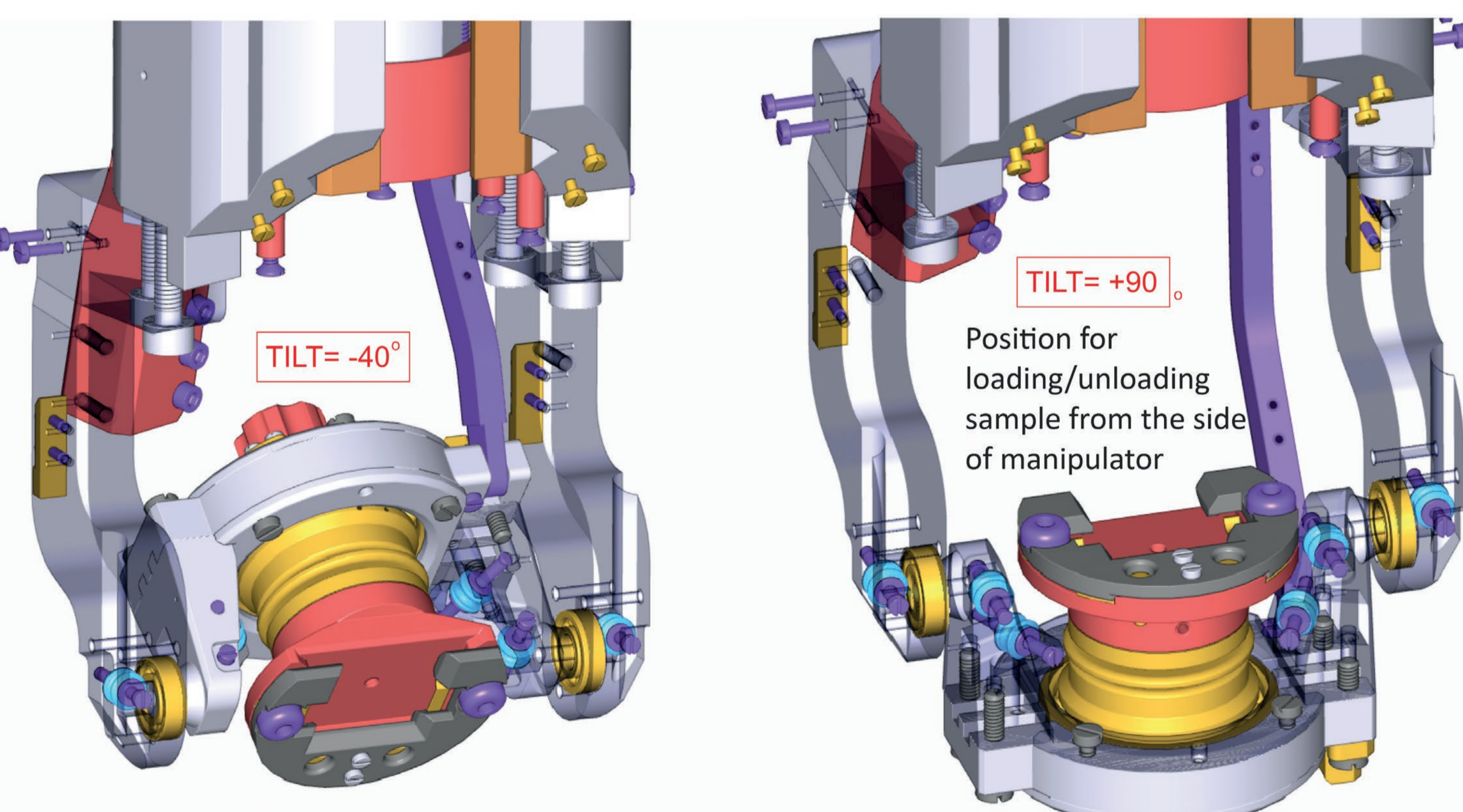
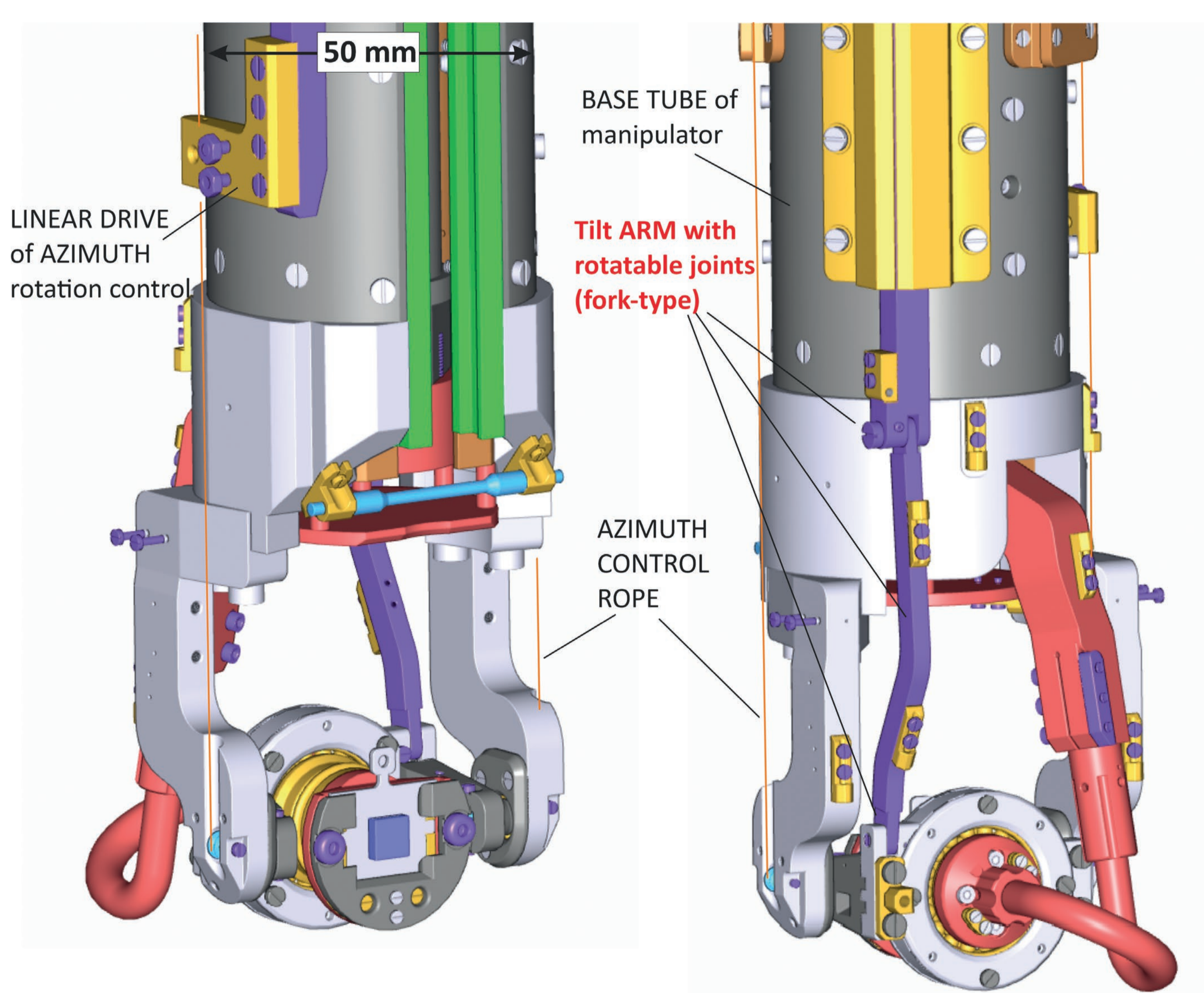
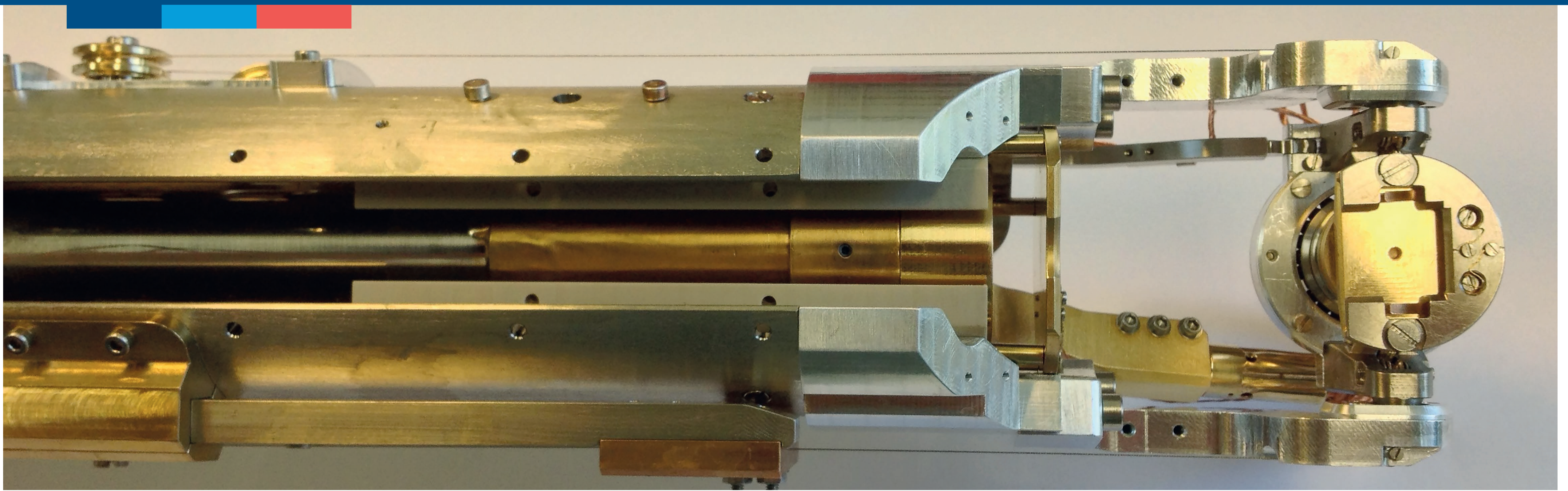


HZB TECHNOLOGY TRANSFER PRIZE 2021

Full 6-axes cryogenic manipulator “S6.Cryo” for ARPES experiments

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Vladimir Voroshnin: PhD in Department Spin and Topology in Quantum Materials (QM-AST) HZB



TILT AXIS in extremal operational positions (+90° and -40°). Flexible thermal coupling (copper braid) is not shown.

Photo and 3D Renderings: Dr. Andrei Varykhalov, Vladimir Voroshnin

INNOVATION

ARPES 6-axes manipulator

It controls sample position in ARPES (angle-resolved photoemission spectroscopy) measurements. The six axes are X, Y, Z, and three independent rotational motions: polar (P), azimuth (A), and tilt (T). It operates under ultra-high vacuum conditions in a temperature range from 10K to 500K.

Advantages compared to competitors:

- small size (70mm in diameter) => can be used in most of the ARPES vacuum chambers
- full 130° Tilt rotation => it becomes possible to measure at higher emission angle, e.g., to probe remote Brillouin zones in the sample
- optional add-on for realization of in-operando sample environment, e.g., magnetic field and electrical contacts
- two years of daily usage prove and direct users' feedback at 1^2 ARPES station at BESSY II



arpes-robotics.com

Patents related to upcoming HZB spin-off ARPES-Robotics:

1. Patents (DE 10 2020 122 517.2) «Vorrichtung zur Rotation einer Probe um zwei orthogonale Achsen» and (DE 10 2020 123 053.2) «Baugruppe zur Bildung einer Vorrichtung zum Wärmeaustausch zwischen zwei Festkörpern»
2. Utility model (DE 20 2020 106 734) «Thermische Isolation für einen Kryostaten»