



Contribution ID: 400

Type: **not specified**

## P4.064 Prototyping of stepping-motor hexapod for 6 DoF positioning of optical components in the ITER port interspace

*Thursday, 20 September 2018 11:00 (2 hours)*

For an ITER optical diagnostic, the components located within the port interspace area must be equipped with the proper remotely controlled positioning/alignment mechanisms meeting the variety of functional, environmental and load requirements. For the H-alpha diagnostics the major requirements are: 1) high structural stiffness and positioning stability under the ~100kg weight of Long Focus Spectral Telescope (LF-ST, metal-mirror optical unit of ~0.9m size); 2) high static and dynamic stability under the electromagnetic and vibrational interface loads; 3) low backstroke; 4) functionality in the magnetic field up to ~0.2T; 5) thermal and radiation resistance up to ~120°C and ~10 Mrad respectively, 6) Compact 6DoF design.

The modified stepping motors, implemented in the hexapod holding the LF-ST, have been designed to withstand the radiation and magnetic field loads. Also, the actuator design has been updated after the conducted FEM analysis and preliminary stiffness and stability tests of the commonly used actuator mock-ups. The most flexible elements were eliminated, the gear assemblies and joint were redesigned in order to increase the stiffness above the required 10N/um limit. More details on the test results are presented in a separate submission to the conference [1]

[1] E.Drapiko et al., "Functional and load testing of stepping-motor hexapod for positioning of H-alpha optical components in the ITER port interspace", submitted to SOFT-2018

**Presenter:** YUSOV, Alexandr (LLC Applied mechanics)

**Session Classification:** P4