

Please find enclosed the manuscript “First results of the PROTO-SPHERA experiment: progress towards the sustainment in steady state of the jet + torus combined plasma configuration”.

The PROTO-SPHERA experiment was presented some years ago in this journal (Alladio F. et al 2006 Nucl. Fusion 46 S613; Micozzi P. et al 2010 Nucl. Fusion 50 095004) and is in operation since 2014.

After an excursus about the relevance of the PROTO-SPHERA configuration both for magnetically confined plasma of controlled fusion interest as well as for astrophysical plasmas, this manuscript presents the experimental results that conclude successfully the so called Phase1 of the machine.

The first experimental evidence of the formation and sustainment of the Screw Pinch plus Torus combined configuration is also presented.

The manuscript is limited to the results obtained on PROTO-SPHERA up to the year 2018 since the improvement of the machine set-up and of the plasma diagnostics are still in progress in order to obtain toroidal plasmas of better quality around the central pinch in view of the Phase2 of the experiment. The results of these modification will be presented in a future paper.

Neither the manuscript nor any parts of its content are currently under consideration or published in another journal.

Best regards,

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