TokaLab – Validation Checks

TokaLab integrates various computational modules designed to work together seamlessly. Any modification to these modules must be validated before release to prevent bugs or computational inconsistencies.

To support this process, the TokaLab team employs two levels of validation: **self-validation** and **maintainer validation**. Self-validation involves running the scripts located in the validation folder and comparing the obtained results with the expected reference results provided in this document. Maintainer validation is performed by the designated module maintainers before merging any modifications into the main scripts.

For any issues or questions, contact the TokaLab team at [tokalab.fusion@gmail.com](mailto:tokalab.fusion@gmail.com).

# SimPla – Simulated Plasma

## SimPla\_Validation\_01

This validation script calculates the equilibrium for three standard TokaLab scenarios:

* Single Null (SN)
* Double Null (DN)
* Negative Triangularity (NT)

At the end of the script, the following figure should be plotted:

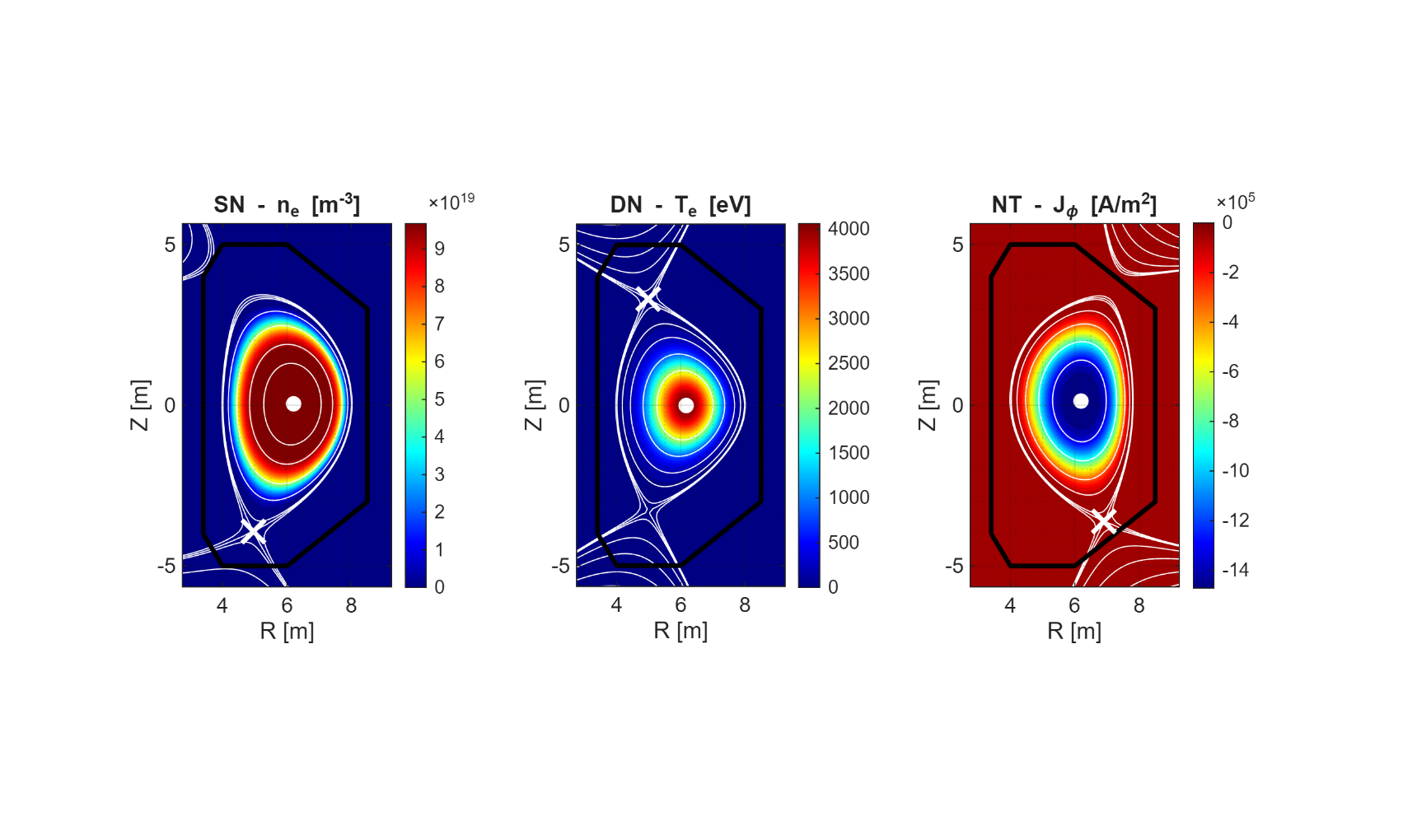


Figure 1 – Output from SimPla\_Validation\_01.

When running your code, compare your results with the reference figures provided above. Specifically, verify the following aspects:

The shape and order of magnitude of:

* Density in the SN case
* Temperature in the DN case
* Toroidal current in the NT case

The positions of the O- and X-points, indicated respectively by a large white dot and a cross. The O-point should appear near the center. The X-point should intersect the separatrix (For the DN case, note that the X-point may appear either at the top or bottom, depending on minor numerical variations. Both are valid X-points, though the current code identifies only one).