

# Study of the multi-driver decoupling model of RF negative ion sources



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## Motivations

According to the latest physics design of the CFETR, RF driven negative ion sources are selected as the preferred ion source for CFETR NBI. To solve the key problems of the CFETR, the engineering design, development, and construction of the Comprehensive Research Facility for Fusion Technology (CRAFT) has begun. The RF driven negative ion sources of CRAFT are Large-area high-current extraction beam sources, it will adopt the working mode of multi-driver distributed driving.

When multiple RF drivers of the same type work at the same time, there may be mutual coupling and interference between them, which results in an asymmetric distribution of the RF magnetic field in the driver, thereby affects the extraction of ion current of the RF negative ion sources.

The analysis of the multi-driver decoupling model of the RF ion negative sources provides theoretical support for CRAFT's RF negative ion sources.

## Methods

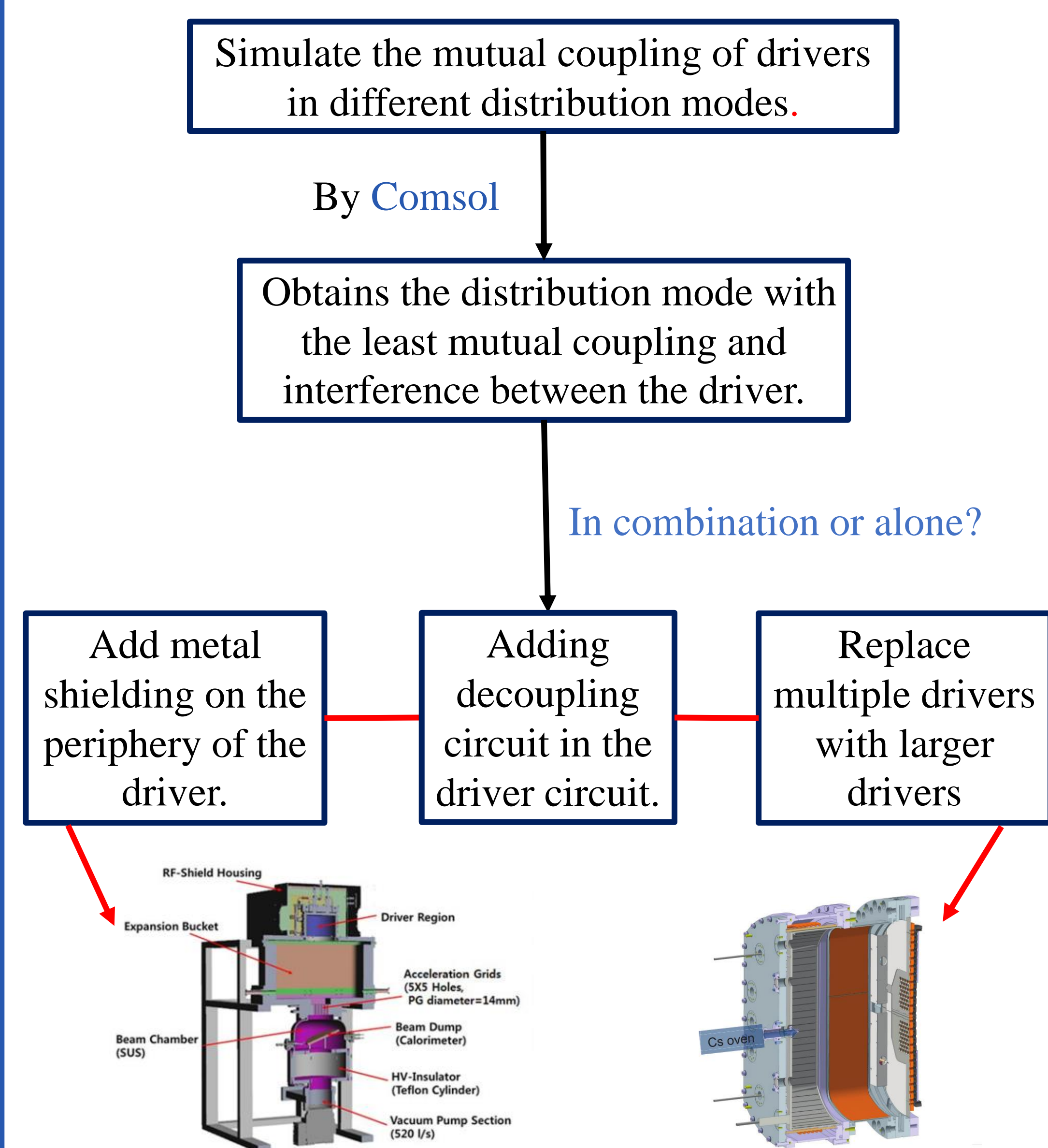


Photo of the test LAHP-RaFIS1

The outside of the driver region was shielded by using a metal housing to prevent the leakage of RF power.

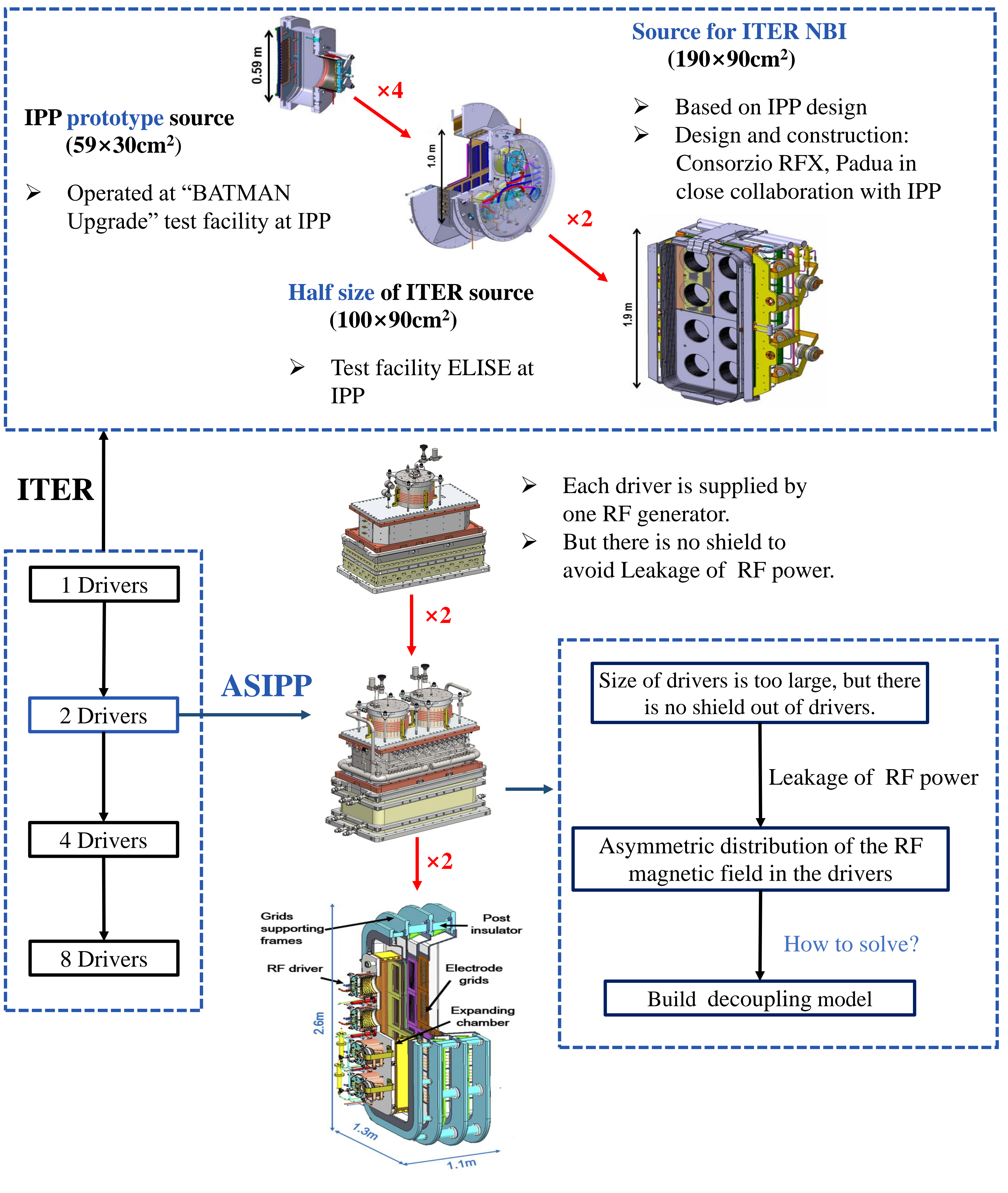
BATMAN source with racetrack shaped driver

A pair of drivers, which are supplied by one RF generator, are replaced with one racetrack shaped driver.

## Development route

### Differences of drivers development route between ITER and CRAFT :

Device name	Power supply mode	Distribution mode
ITER	One RF generator supplies to two drivers, which are connected in series.	Symmetric distribution
CRAFT	Each driver is supplied by one RF generator.	Vertically distribution



## References

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