

## OPTIMIZATION OF THE AVAILABILITY OF THE CORE CXRS DIAGNOSTICS FOR ITER

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The availability of a new optical configuration for the ITER core Charge Exchange Recombination Spectroscopy (CXRS) system offers the possibilities of longer ducts between the first mirror and the plasma. This has led to a rethinking of the possibilities to get an optimal core CXRS port plug design.

Presented is the optimization of the availability using a simple model of the degradation of the first mirror and which starts with the boundary conditions a) required measurement performance and b) geometry of the port plug. This model is then refined to include additional boundary conditions directly influencing system availability such as degradation of the second mirror, presence of a shutter and the availability of a cleaning system. In case a cleaning system is available, the frequency with which it is possible to do the cleaning within the ITER schedule is a factor in the calculation.

It is found that for a fully passive system the design should strive for the longest duct length possible. Given known data, this will result in a lifetime substantially lower than ITER lifetime. When it is supposed that cleaning of the first mirror is feasible, finding the optimum is less straightforward because also the lifetime of the second mirror becomes significant. The optimum then depends on the ratio between the cleaning interval and the ITER lifetime. Options are presented for various sets of assumptions.