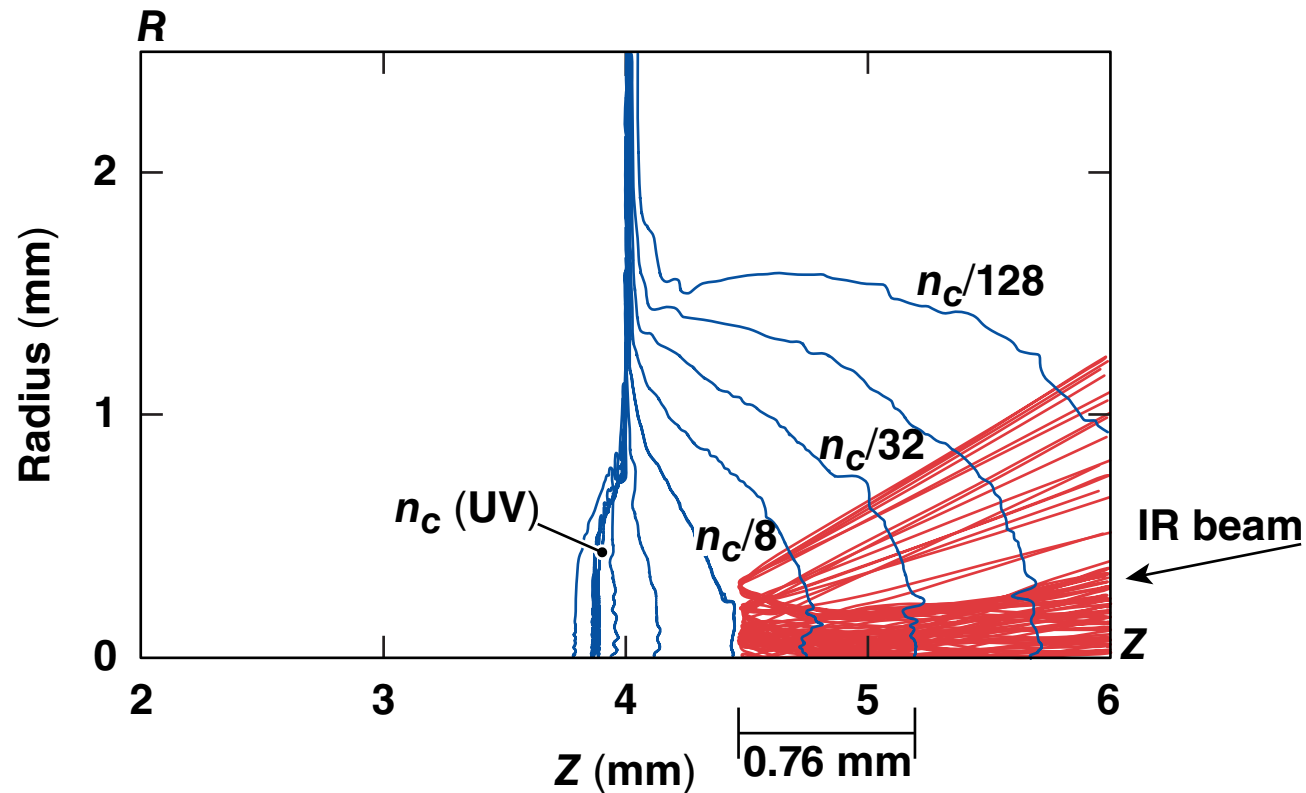


Hydrodynamic Simulations and Optical Diagnosis of a Long-Scale-Length Channeling Experiment on OMEGA EP



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Summary

A channeling experiment is planned for OMEGA EP to study physics related to fast ignition



- A long-scale-length plasma ($L \sim 0.5$ mm, $T_e \sim 2$ keV) will be generated with the long-pulse UV beams and irradiated with a 100-ps IR channeling beam
- The plasma formation will be diagnosed using grid image refractometry (GIR)
- The channeling will be diagnosed using a schlieren technique
- A 10-ps, UV probe beam is being developed

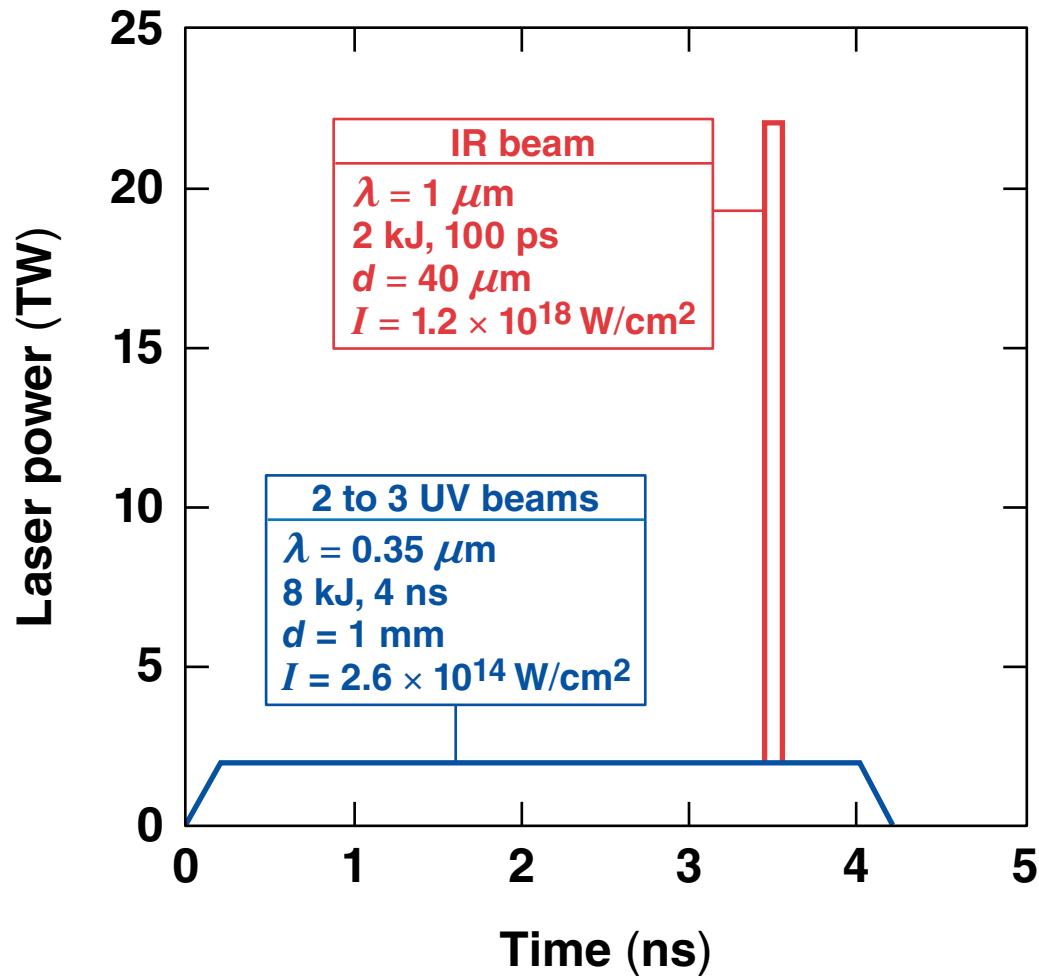
Collaborators



**W. Theobald, W. Seka, S. Ivancic, G. Li,
C. Ren, and D. Weiner**

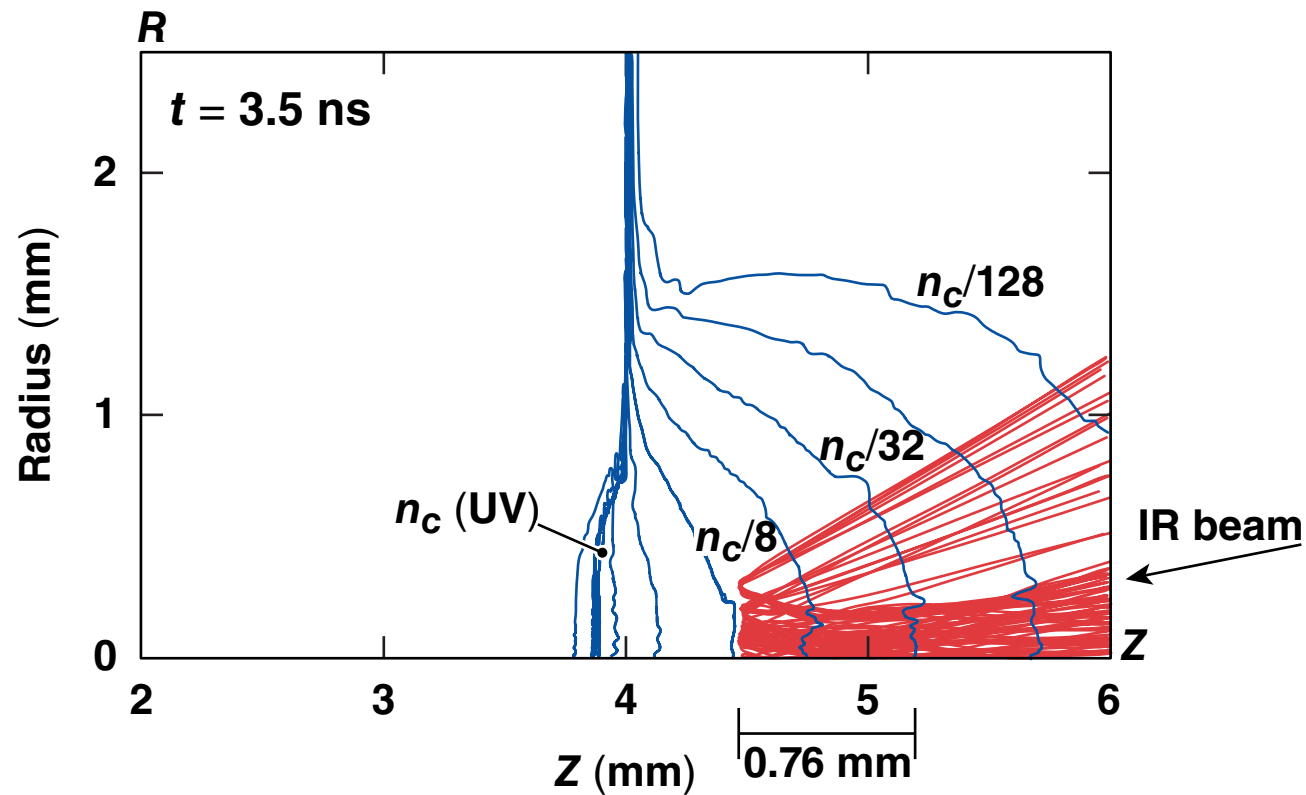
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The experiment makes use of OMEGA EP's unique capabilities



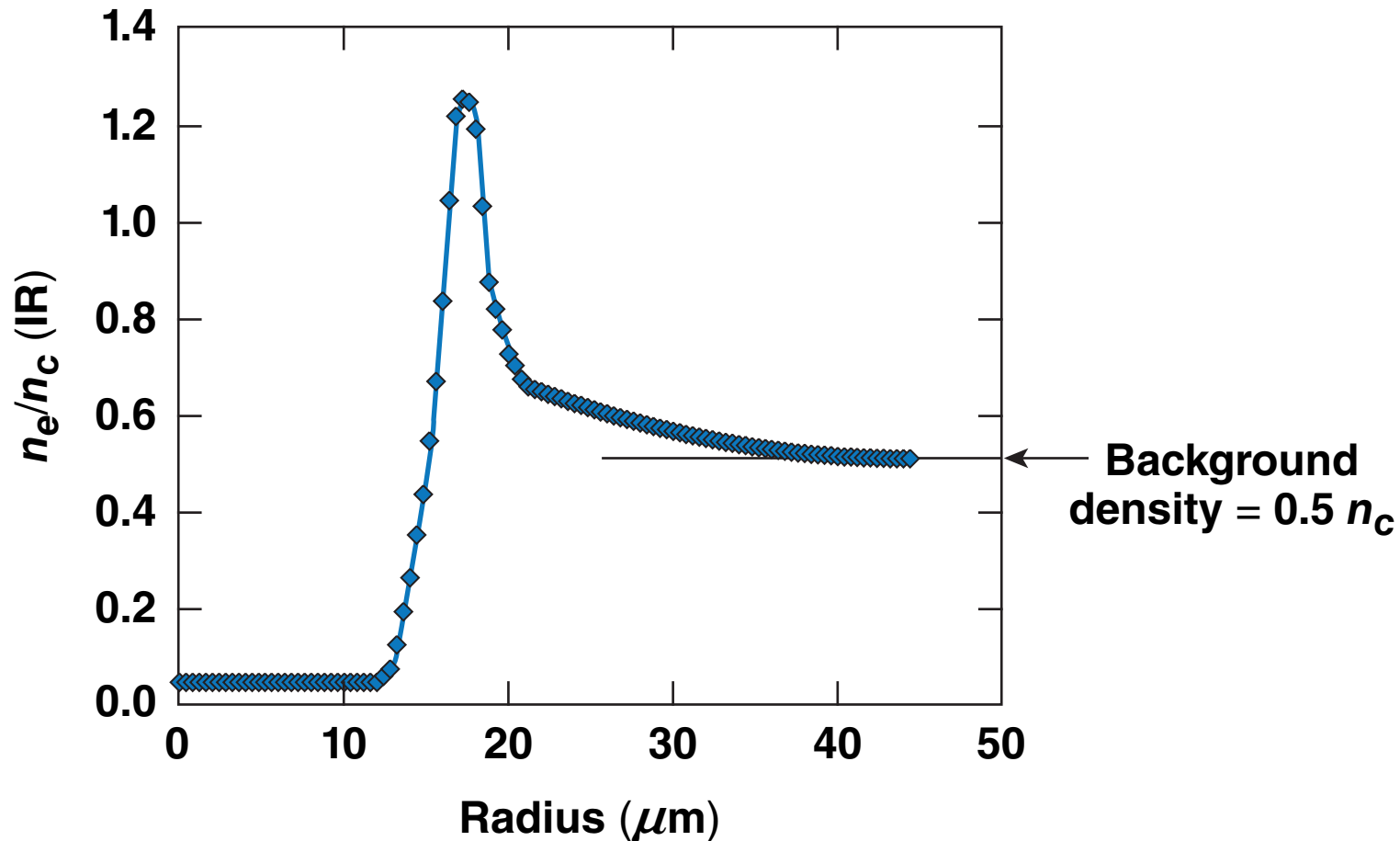
The IR beam is focused into a plasma with a 0.55-mm scale length

- Peak of the IR beam

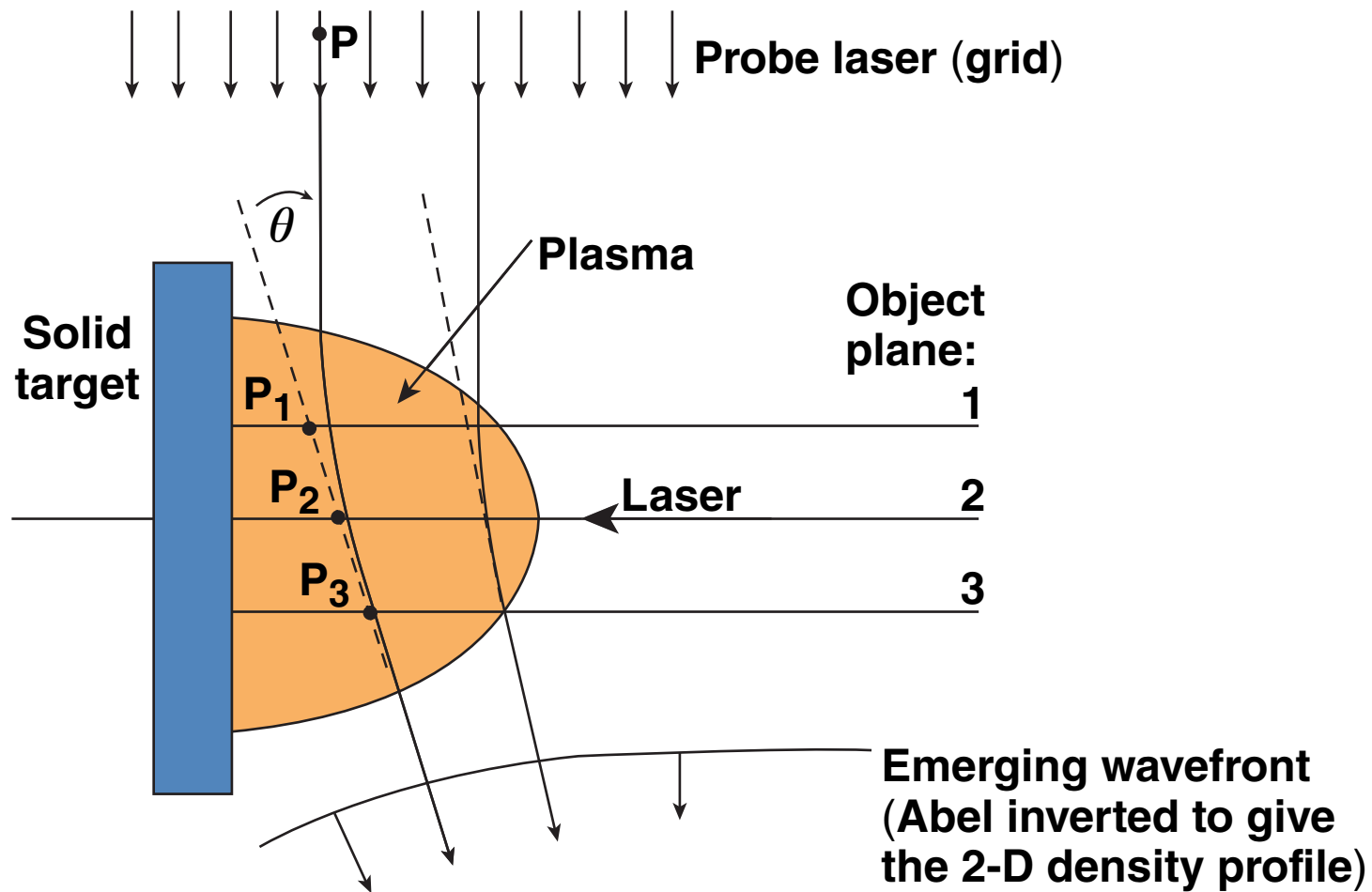


A PIC simulation* predicted a deep density channel of radius $\sim 20 \mu\text{m}$

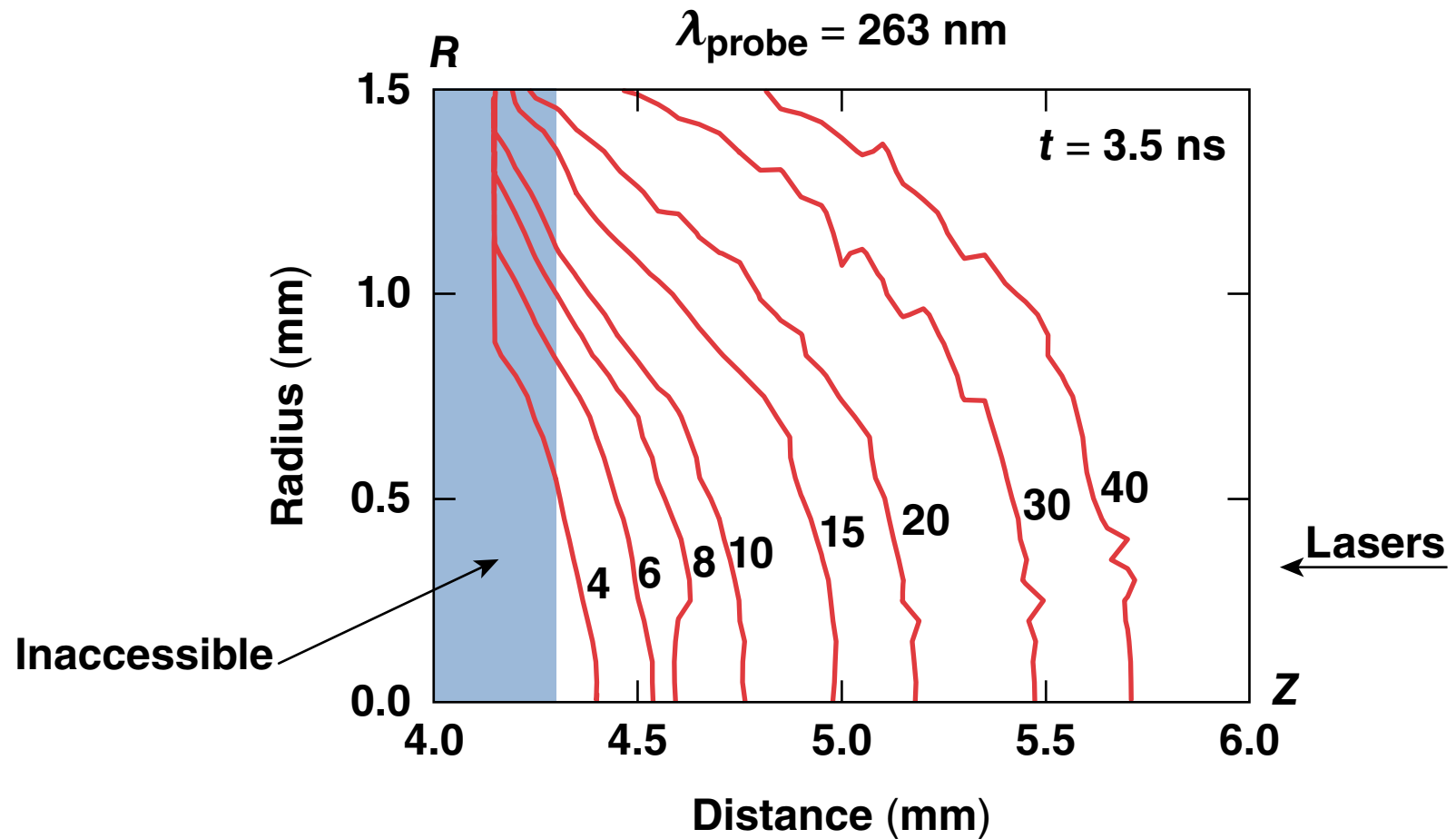
- This profile was spliced into *SAGE* profiles for optical probe modeling



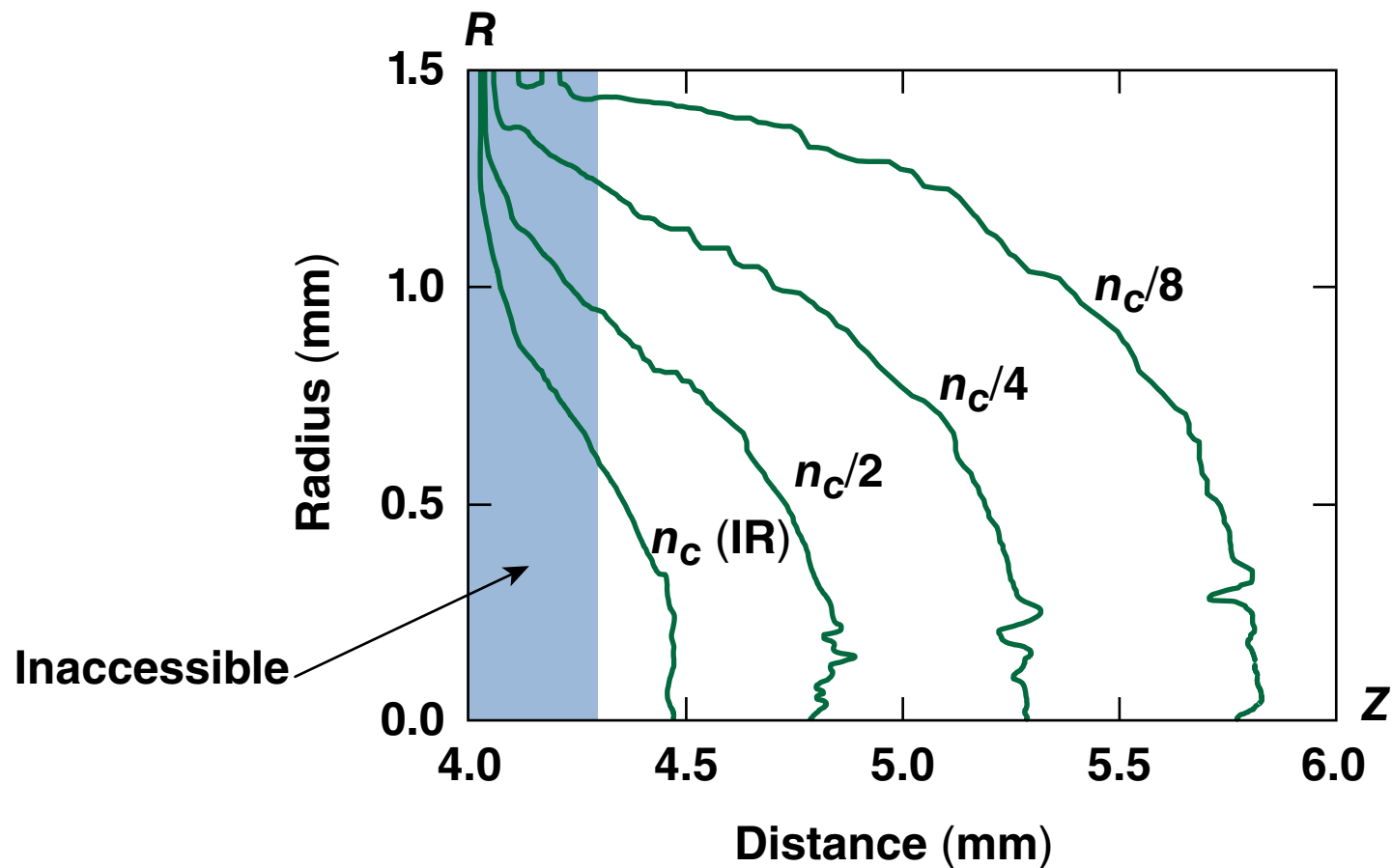
In grid image refractometry (GIR),* the probe beam is passed through a grid and the ray deflection angles are measured



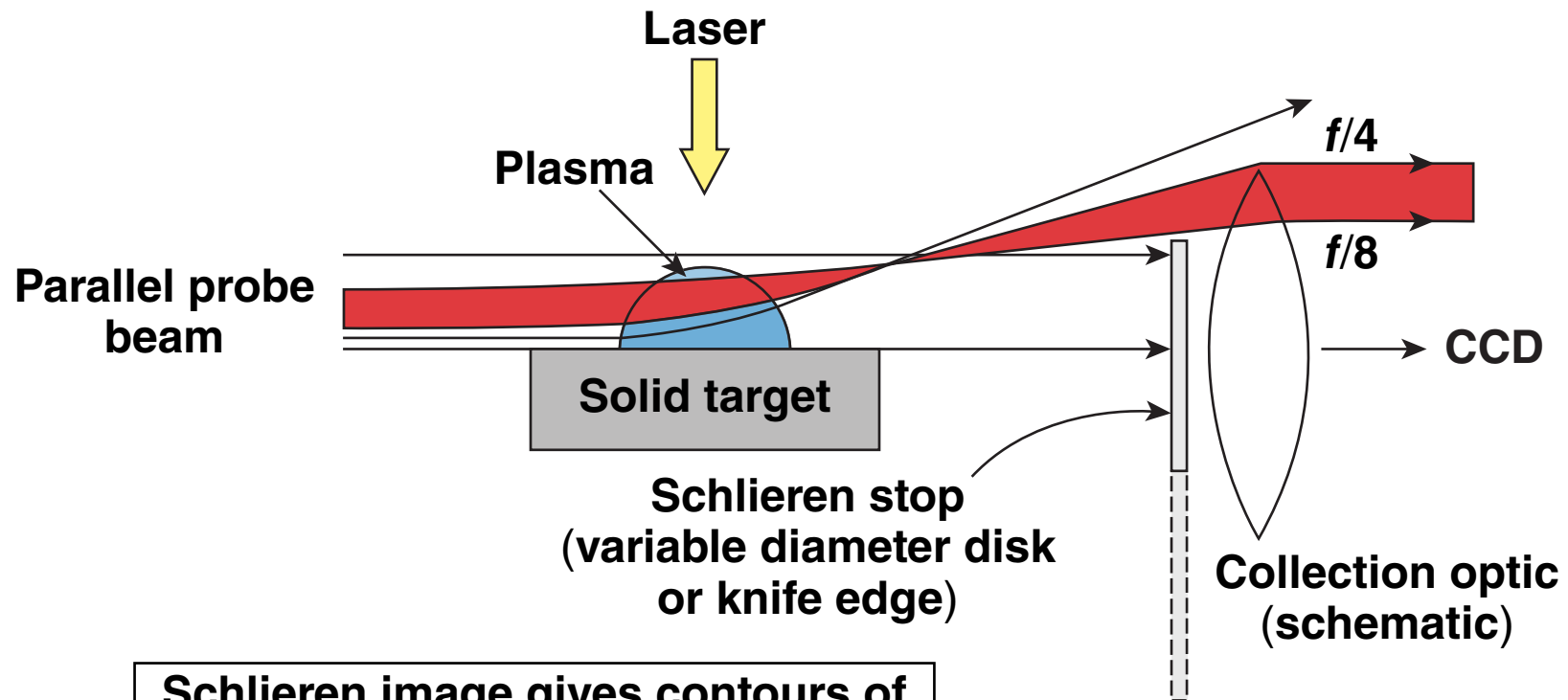
The ray deflection angles of interest range from $f/4$ to $f/40$



The densities of interest range from IR critical to eighth critical

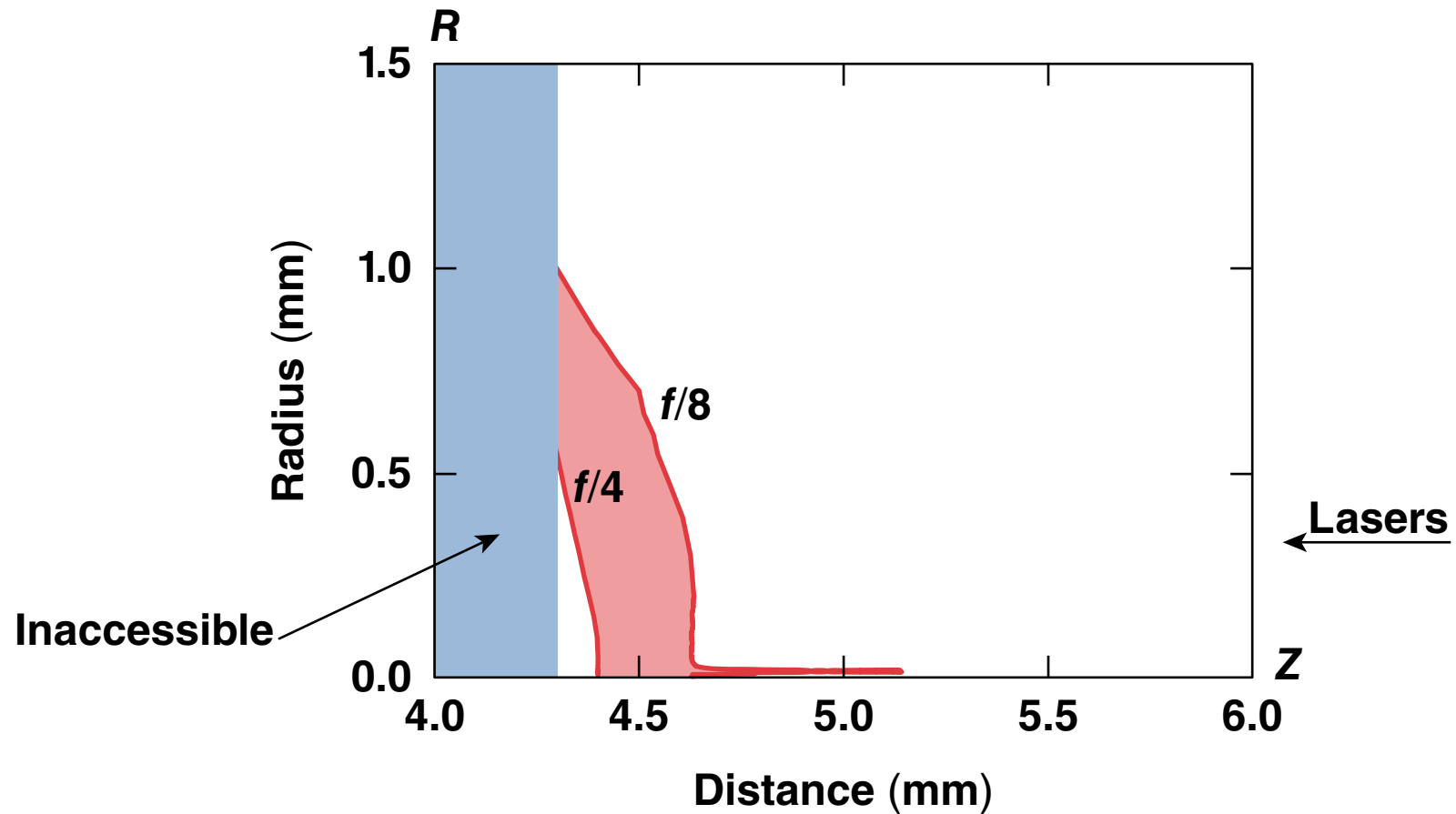


Density channels in the plasma will be diagnosed using a schlieren technique

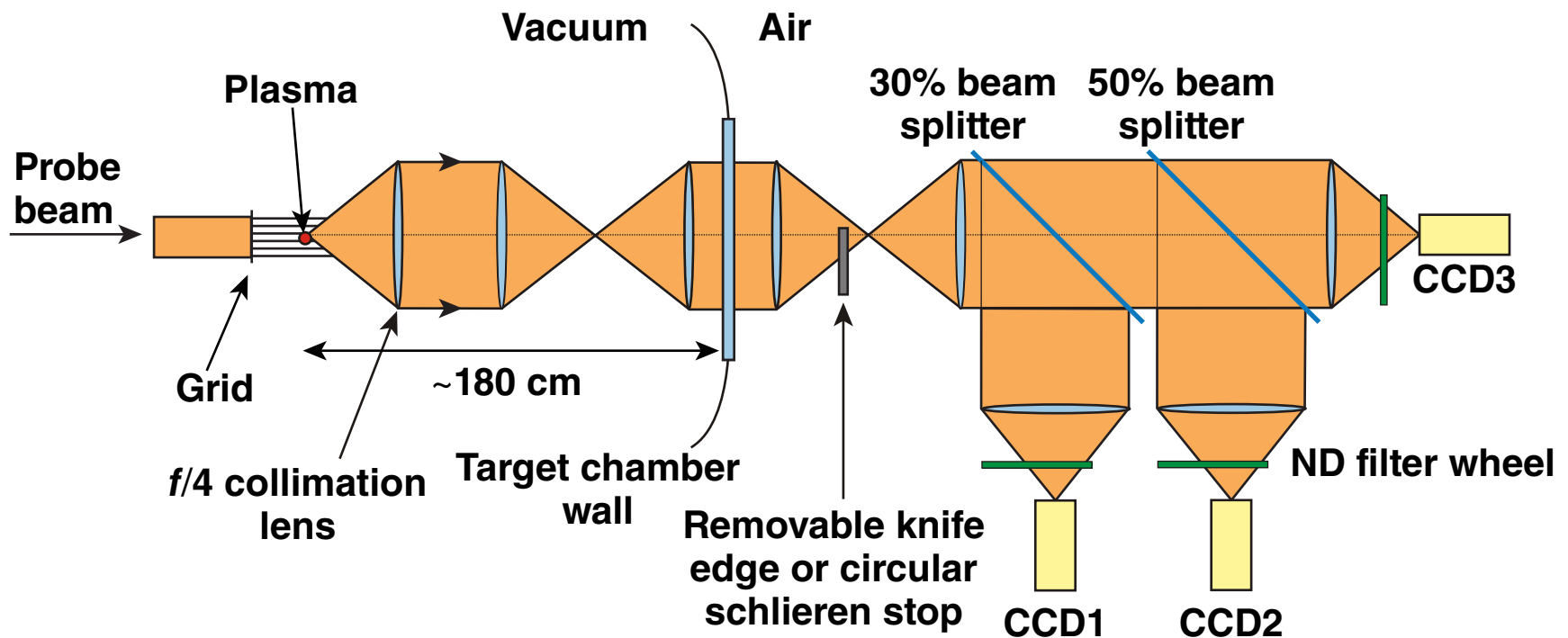


Schlieren image gives contours of upper and lower deflection angle.

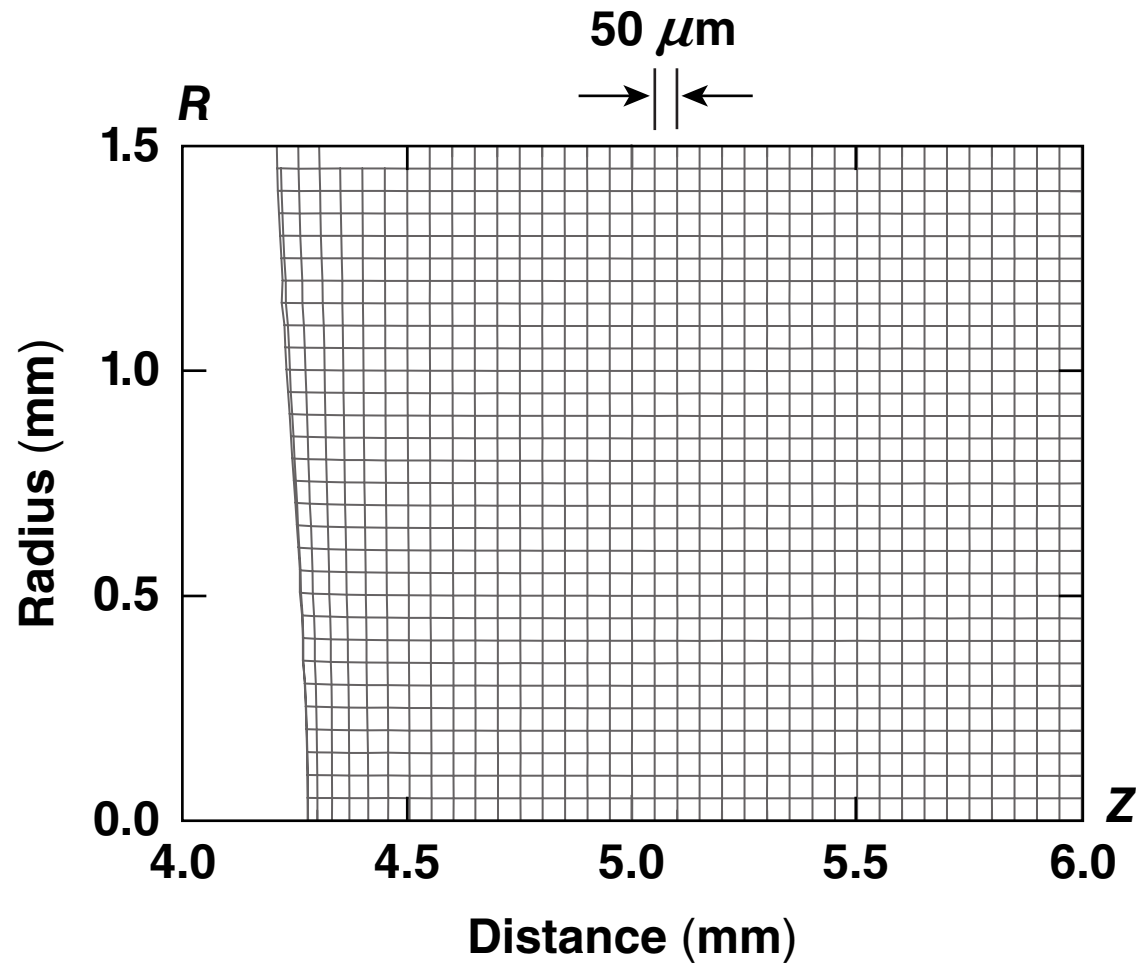
The low-density channel should be easily seen with an $f/8$ schlieren stop



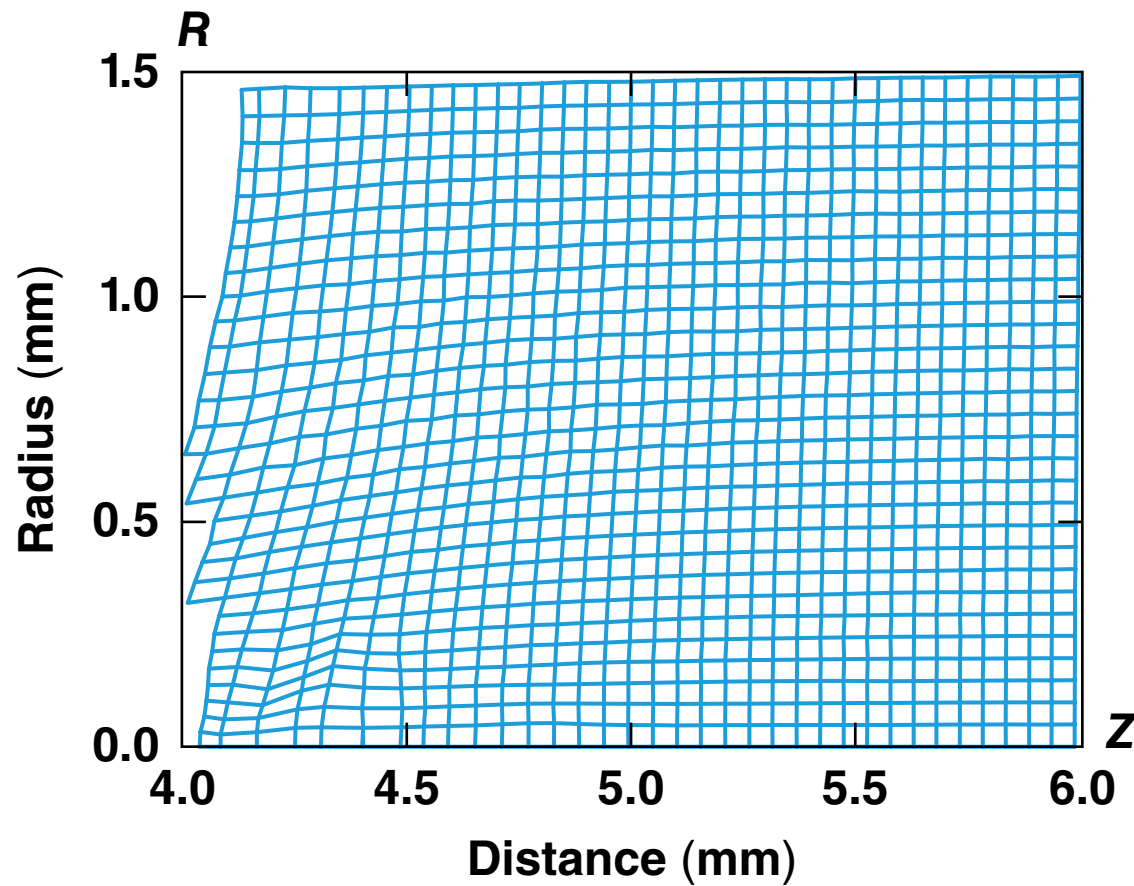
The 263-nm UV probe beam on OMEGA EP will be used for both grid image refractometry and schlieren



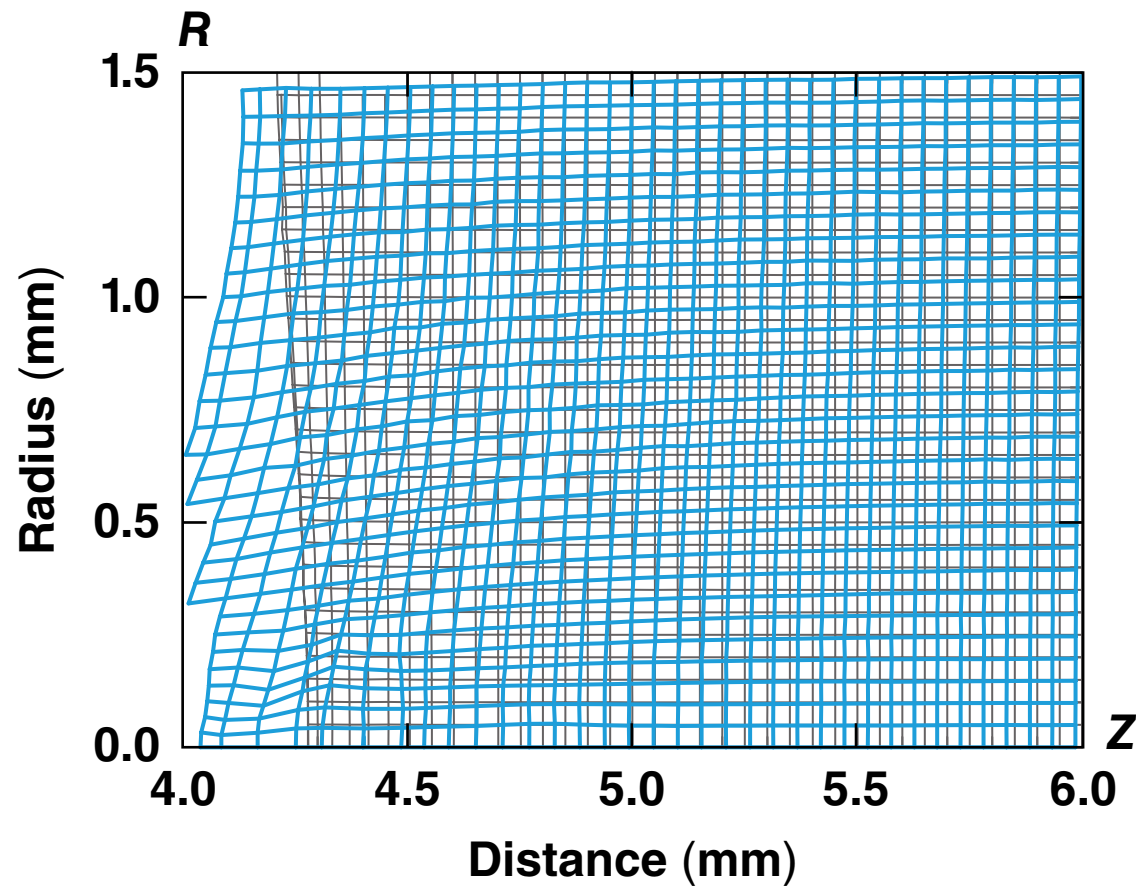
With the object plane at the center of the plasma,
the grid is largely undistorted



With the object plane 2 mm behind the center of the plasma, the grid deviations can easily be measured



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Summary/Conclusions

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First experiments are planned for July 2010.