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TIME-DEPENDENT STUDY OF HALL THRUSTER PLASMA

M. Kundu (IPR)

Numerical and theoretical study on Hall thruster is being carried out in the modeling group of the Institute for Plasma Research, India. Earlier we have reported a steady state fluid simulation for a SPT-100 type thruster. A fair description and the results on steady state modeling have been mentioned in the earlier report and we do not mention them here for conciseness. During this period various improvement have been made on the steady state model. However, we also study the time dependent response of the thruster plasma in parallel. The time dependent modeling is appealing, for the explanation of experimentally seen current oscillation in thruster. Therefore, in this article we report a time dependent study with some simplification of the electron momentum equation. In future our aim is to consider the full electron momentum equation for completeness. Although the model is simplified, it exhibits current oscillation in space. The results are qualitative. Quantitative comparison will be reported in future with the full model.

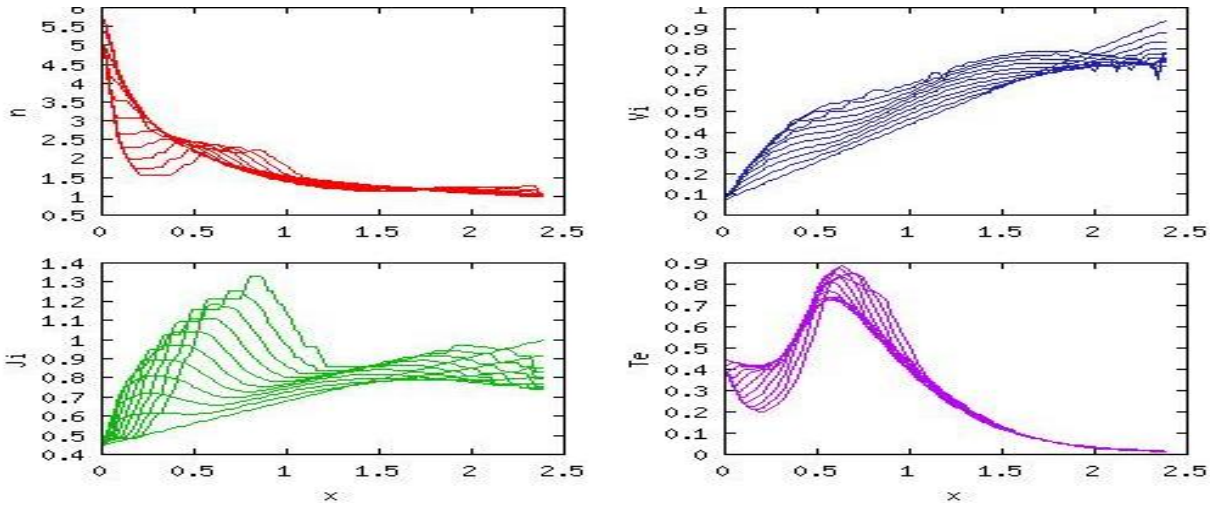

Figure: Temporal evolution of plasma density, ion velocity, ion current density and electron temperature in a Hall thruster (preliminary results from simulation)

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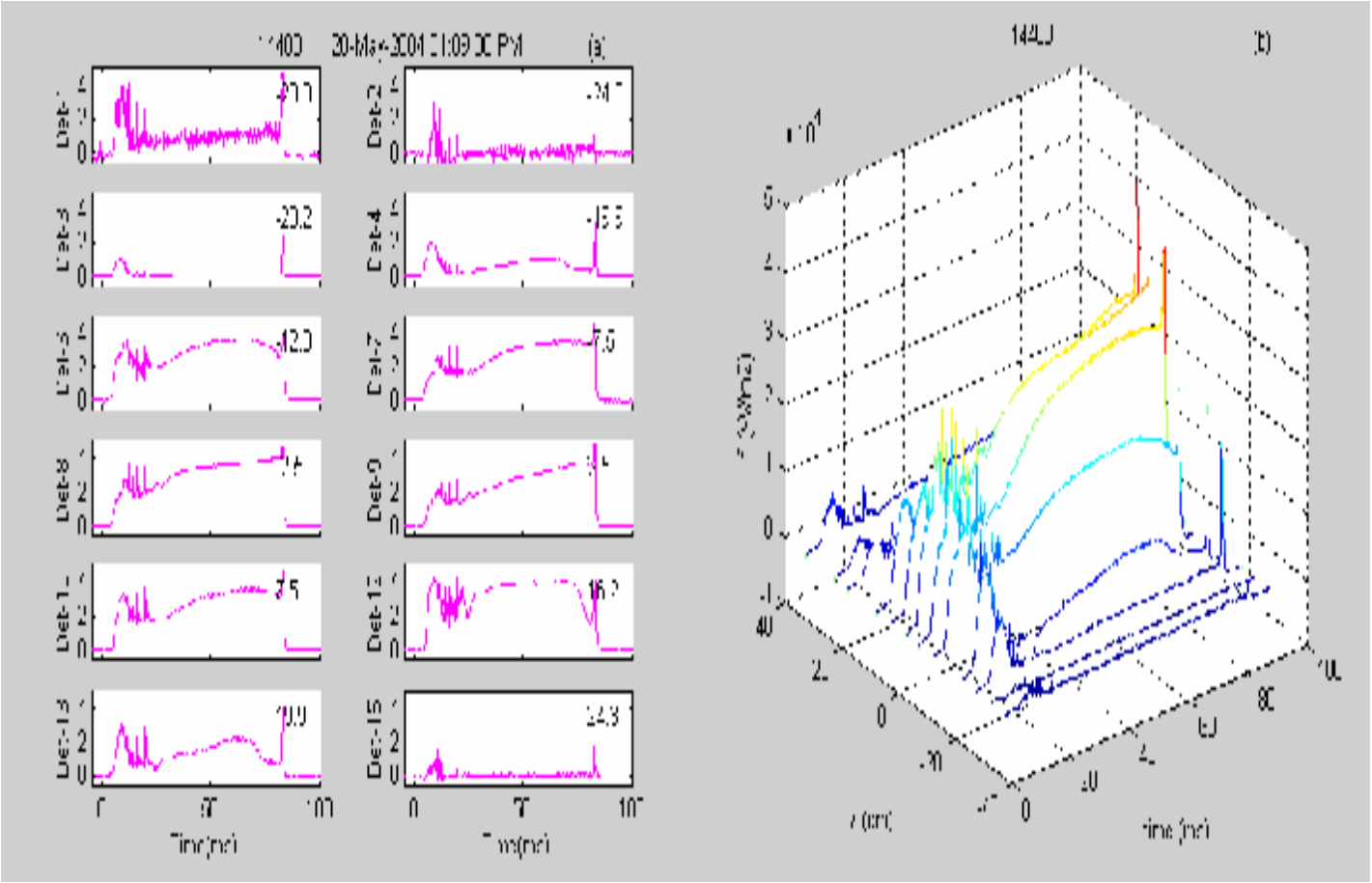
INITIAL RESULTS OF THE BOLOMETER ARRAY MESUREMENTS IN ADITYA

Kumudni Tahiliani, R.Jha (IPR)

A considerable fraction of the input heating power of a tokamak plasma is lost through impurity line radiation mainly in the VUV to soft X-ray spectral range. Bolometer systems installed in the tokamak are used to determine the local radiation emissivity and the total radiated power of the plasma. A new array consisting of 16 AXUV photodiodes has been recently installed on the radial port in Aditya for bolometric measurements. The detectors have a fairly constant responsivity (0.2-0.27 A/W) in the wavelength range, 2Å-2000Å and have a fast time response (0.5µs). The array views whole poloidal cross-section and the SOL plasma. Figure (a) shows the results of the various channels from a typical discharge in Aditya. The line-integrated emissivity for the channels is shown in figure (b). We observe that the maximum line-integrated signal comes from the plasma core. Efforts are being made to determine the emissivity profile.



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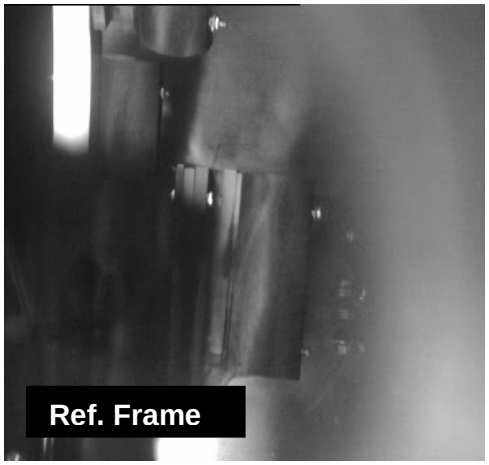
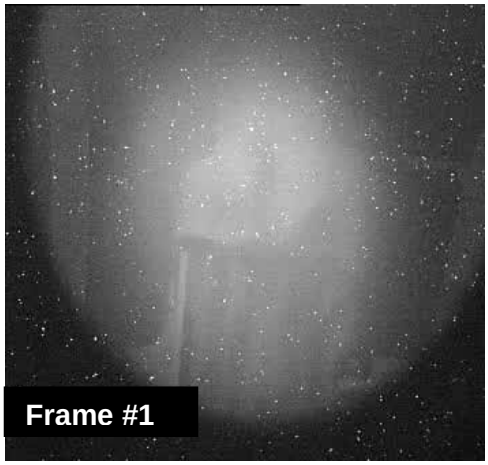
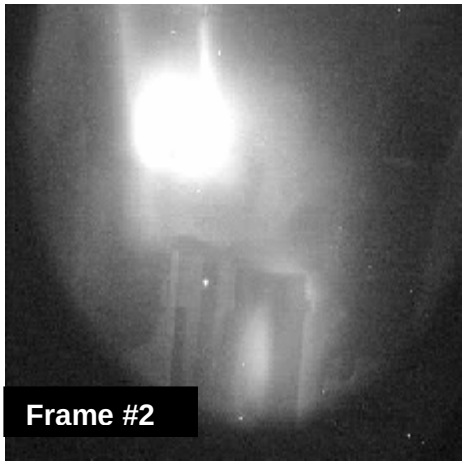
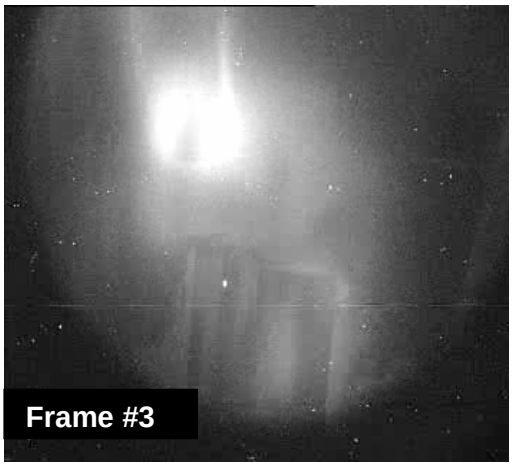
IMAGING FOR STUDYING THE LIMITER-PLASMA INTERACTION IN TOKAMAK ADITYA

Ahmed Saiyed Maqbool (IPR)







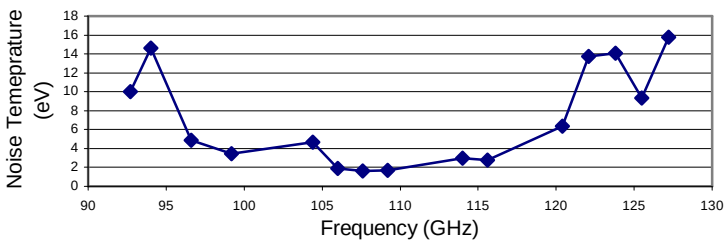


Plasma evolves in the early phase of the shot (frame #1, around 10 ms); Then the interaction of plasma with limiter shifts from the upper segment (frame #2 and #3, around 50 ms and 90 ms) to the machine midplane segment (frame #4, around 130 ms)

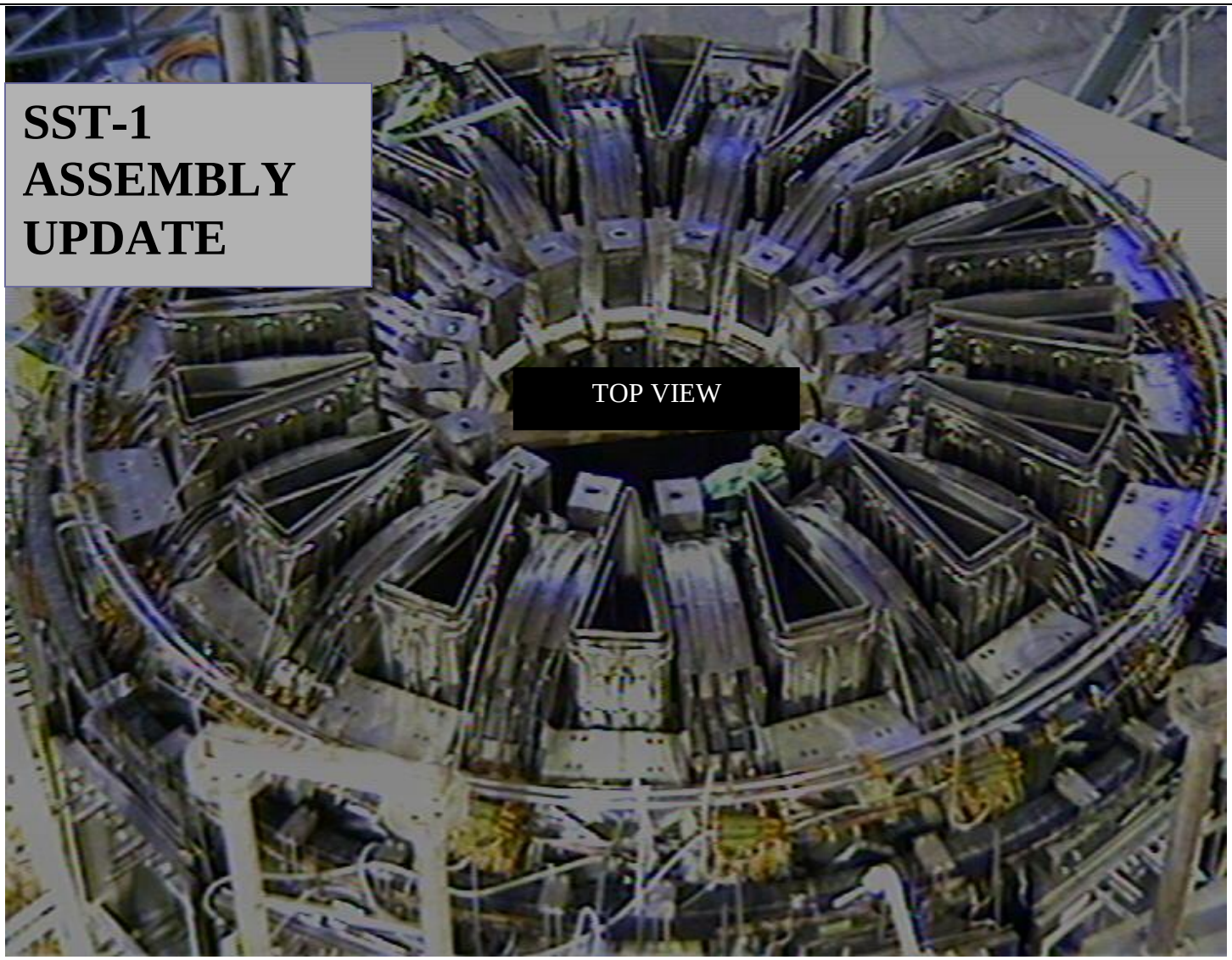
NOISE FIGURE MEASUREMENT OF SST-1 RADIOMETER

N Y Joshi, H K B Pandya, P K Atrey, K K Jain (IPR)

Noise temperature of SST-1 radiometer at various frequencies is measured by setting up an experiment at the laboratory. It is observed to be varied between 1.6 and 15.7 eV. It is also observed that y-factor is less than one for some channels which may be due to the impedance mismatch (intermediate frequency (IF) band 1-40 GHz).



SST-1 ASSEMBLY UPDATE



SST-1 assembly and commissioning is in full swing. The superconducting magnet coils have been positioned. All the heat shields and cooling headers are also in place. A complete vacuum vessel has been formed by in-situ welding of vessel sections. We have also cooled down one test toroidal field coil to liquid Helium temperature to establish the cooling procedure. Few diagnostic systems and electron cyclotron resonance heating system for pre-ionization are also being integrated with the machine. The water cooling systems, bus bars and power supplies are also getting ready for energizing of the magnet coils. We are hopeful of closing the cryostat, starting evacuation and cooling down by the end of this year.

NEWS: **Fourth IAEA Technical Meeting on Steady-State Operation of Magnetic Fusion Devices and MHD of Advanced Scenarios**

The Fourth IAEA Technical Meeting (IAEA-TM) on Steady State Operation of Fusion Devices and MHD of advanced scenarios will take place from 1 February to 5 February 2005 and will be hosted by the Institute for Plasma Research, Gandhinagar, India (The previous meetings were held in Greifswald (Germany) and Arles (France), Kyushu (Japan) and Hefei (China)).