Status of NSTX Liquid Module

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Outline

- Issues raised during the presentation to the NSTX Research Forum
- Short version of answers to some questions
- Results of analysis of the ion saturation current issue
- Status of proposal
- Next steps

Issues Raised During Presentation

- Can the module also pump He?
- Will the forces due to ion saturation current variation cause too much motion of the liquid?
- What is the project cost?
- What will be the effect of disruptions on the flowing liquid?

Short Answers to Some Questions

- Helium pumping is an unresolved issue that is being studied in laboratory experiments. We expect some results over the next year and complete results by the time the module is deployed.
- The project cost cannot be estimated until the pre-conceptual design is completed in FY01.

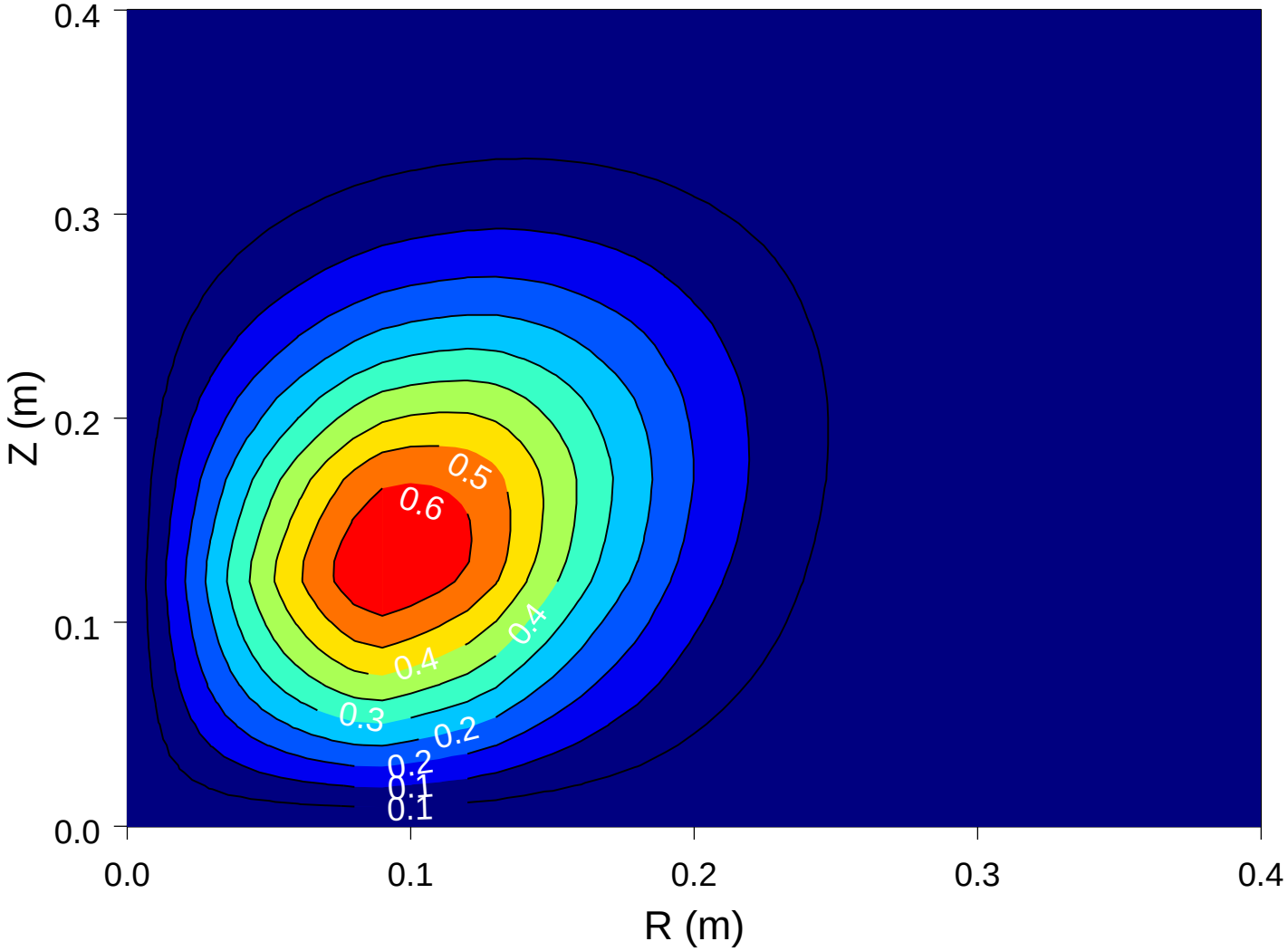
Short Answers to Some Questions

- Disruption forces on the flowing liquid are being calculated. The results will be discussed as they become available. Splashing of the liquid is very likely to occur. CDX-U had just talked about cleanup of Li from their chamber.

Analysis of Ion Saturation Current

- Because of the variation of electron temperature and density over the surface of the module, the sheath potential will vary and currents will flow to balance the potential differences. The most current that can be drawn is the ion saturation current at the strike point.
- $Isat = 0.5\ C_s\ n_e$

Ion Saturation Current



Forces Due To Ion Saturation Current

- Since the currents are modest < 1A/cm2, the forces on the liquid are also modest.
- I conclude that this is an ignorable effect for NSTX.

Status of proposal

- A letter of intent has been sent to NSTX. This indicates that we will propose to continue this project and seek funding to produce a module.
- A record of discussion form is being prepared. This records issues that need to be resolved and the resolution of those issues.

Next Steps

- Pre-conceptual design will continue in FY01.
- We will discuss detailed task planning at the next ALPS meeting in early May 2001.
- Some assistance may be needed for NSTX to implement Li wall deposition.