



# ALPS - Heat Transfer

## LIMITS Experiments

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*February 11, 2003*

*ALPS E-Conference Call*

**Contributors:**

**Tina Tanaka**

**Jimmie McDonald**

**Tom Lutz**

**Ken Troncosa**

**Fred Bauer**

**Dennis Youchison**

**Mike Ulrickson**

**Richard Nygren**

***Sandia National Laboratories***

*Sandia is a multi-program laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under Contract DE-AC04-94AL85000.*



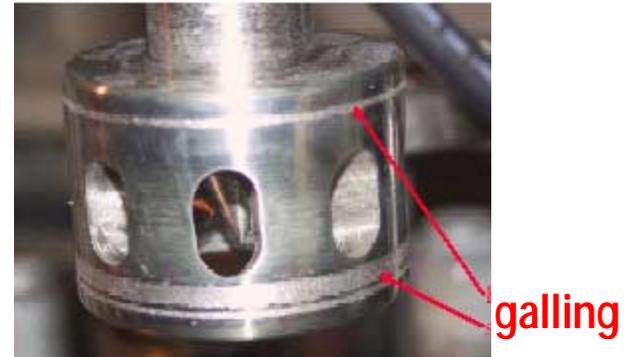
## Update on NSTX plans (Ulrickson, APEX E-Conf 4feb03)

- Decision point to install a liquid divertor module delayed to 2006.
- Cryopumps will be installed in 2004 to provide density control. *The design is not yet done and the modeling for this design is competing with the analysis of the effect of liquid surface pumping on NSTX plasmas (adjust funding and schedule??).*
- Presentation to PAC of results of MHD testing delayed to ~jan04.
- ALIST Task will consider revising course of action.
  - A. Continue development of experiments/models at same pace.
  - B. Consider a full toroidal divertor for NSTX in 2006.

## Changes to Limits

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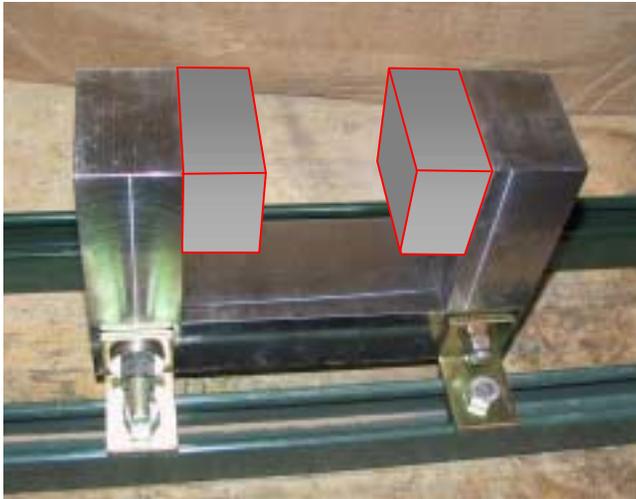
- Pump modified. (received in Jan.)
  - Impeller coated with 0.2mm of Mo and pump rebalanced
  - Water flow test – 40gpm at 3.6psi, 13.3psi static head



- Install different heaters and more controllers.  
*Increase heat to massive fittings and better control heat distribution.*
- Replace helicoflex gaskets with high pressure gaskets.  
*Helicoflex gaskets are expensive and cannot always be reused.*
- Remove glass on viewing ports.  
*Under low gas pressure, Li flow into furnace cracked the quartz.*

# Changes to Limits

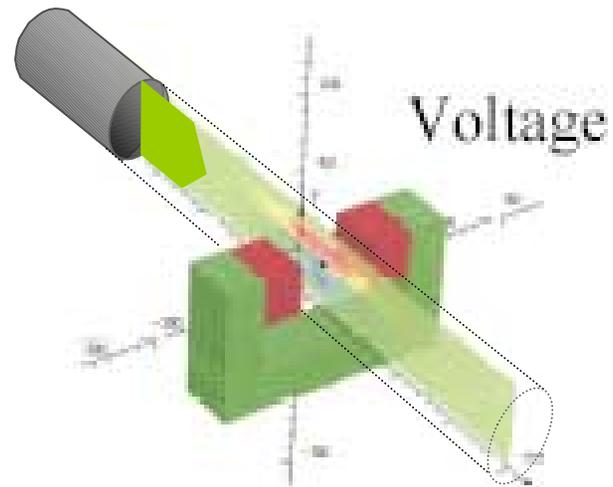
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## EM Flow Meter

- Yoke fabrication completed; parts received; assembly in progress
- Initial calibration to be done using flow in transfer cask

- Voltages calculated using a PC Opera model of our flow meter configuration agree well with published data



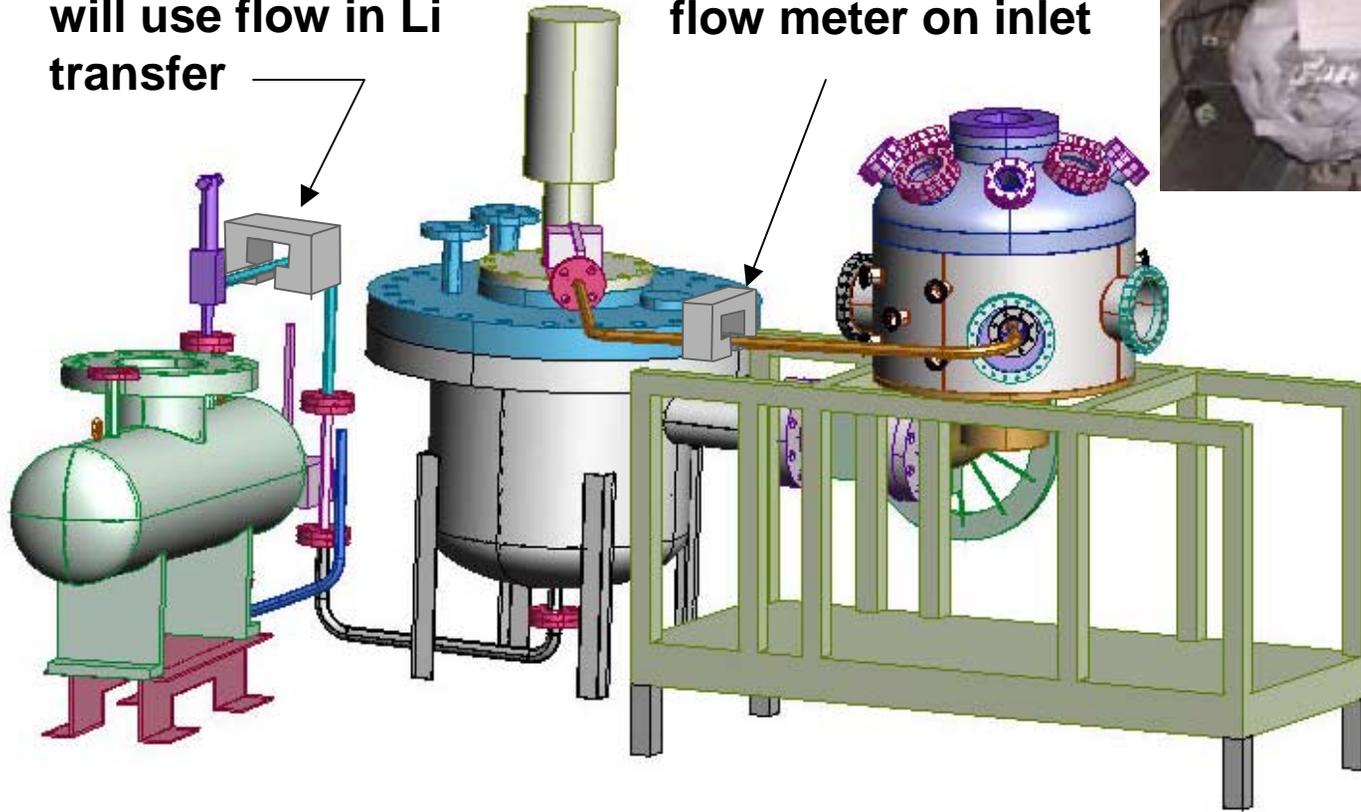
February 11, 2003

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# Changes to Limits

## EM Flow Meter

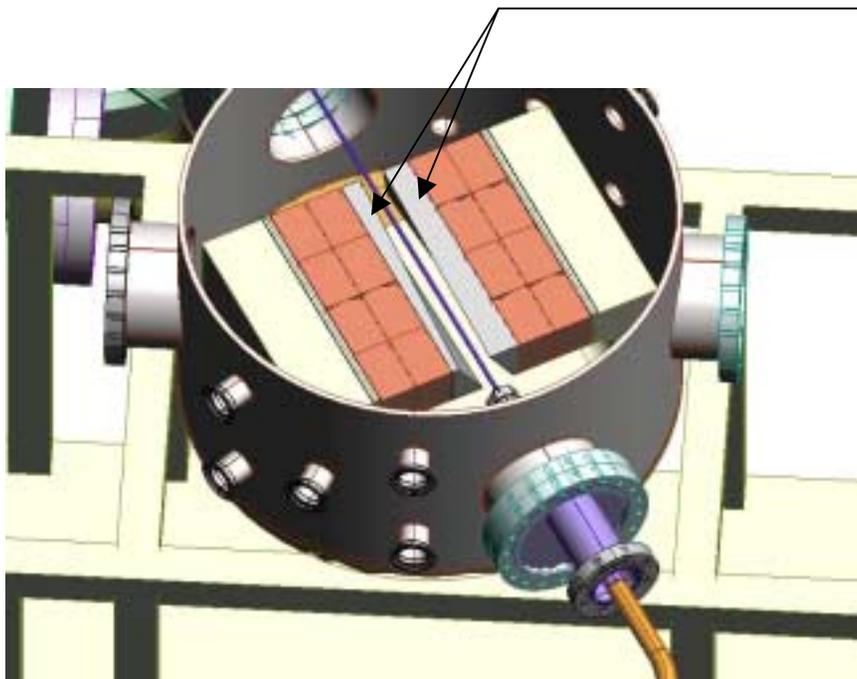
- Initial calibration will use flow in Li transfer
- For loop operation flow meter on inlet



February 11, 2003

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# NSTX Flow Experiment



## Magnet

- New pole pieces were fabricated per design presented in Nov.
- Parts were received.
- Assembly to be done.
- Recommence testing in March.
- Modeling of currents induced in rigid Li slug moving in B-grad in LIMITS is in progress.

February 11, 2003

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# ALPS Heat Transfer Questions

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## Directions/Questions

- **NSTX module – continue current preparations or consider toroidal divertor.**
- **APEX-RS/CLIFF edge modeling by Rognlien & Rensink has shown promising result for high radiation that mitigates peak heat load in the divertor. How active should ALPS be in promoting the desirability of this result in regard to tokamak research?**
- **With the “MHD problem” still unresolved by modeling, how should ALPS proceed to explore LM applications?**