



Electron Beam Gun Design

Li Coatings on NSTX

Nov 17-20, 2003

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Presented at ALPS/PFC Meeting**



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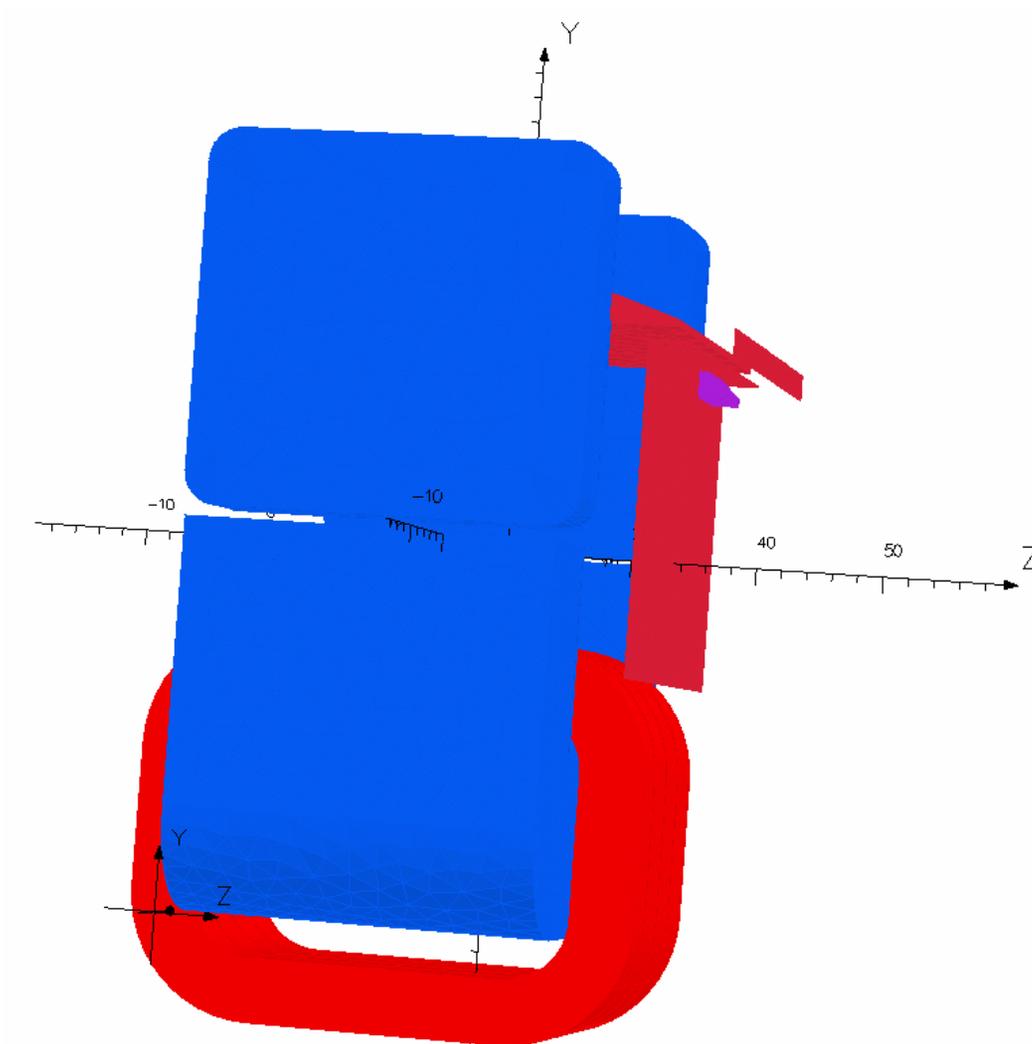




Outline

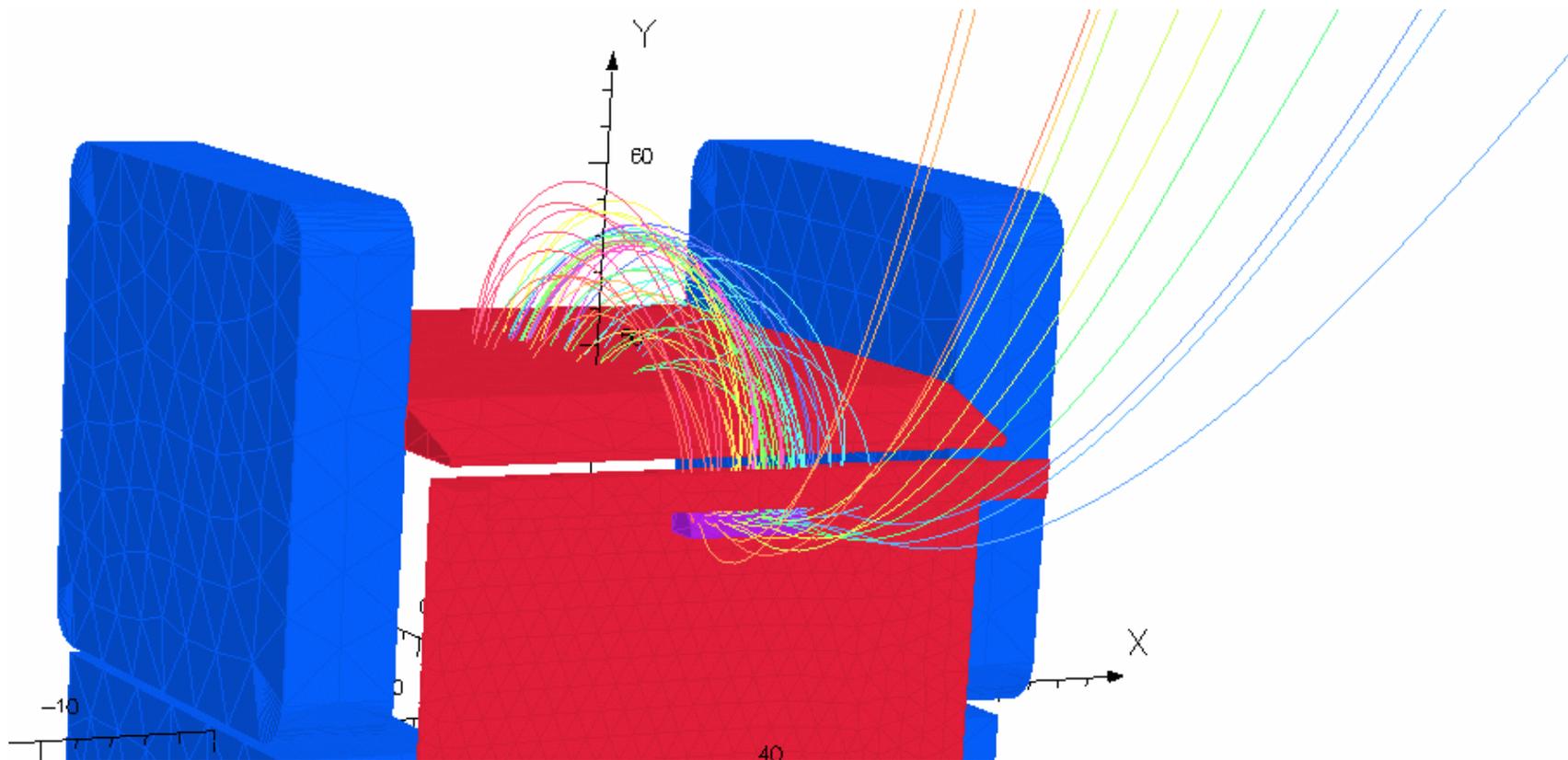
- **Objective**
 - **Determine if commercial egun can be modified to remove permanent magnet material**
- **Method**
 - **Used OPERA to calculate electron trajectories from the filament to the target area with electromagnet replacing permanent magnet**
- **Results**
- **Conclusions**

Component Geometry



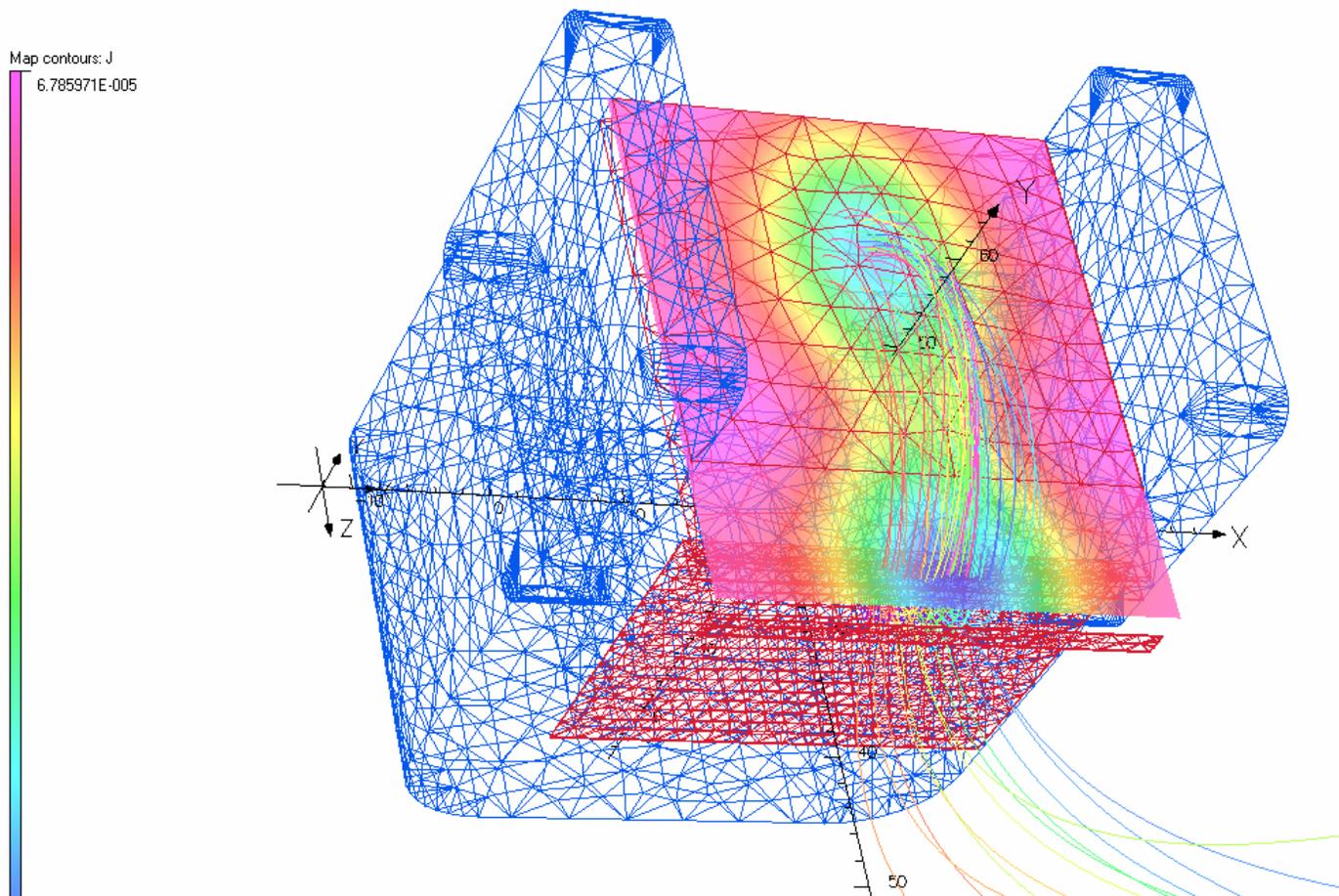


Electron Trajectories

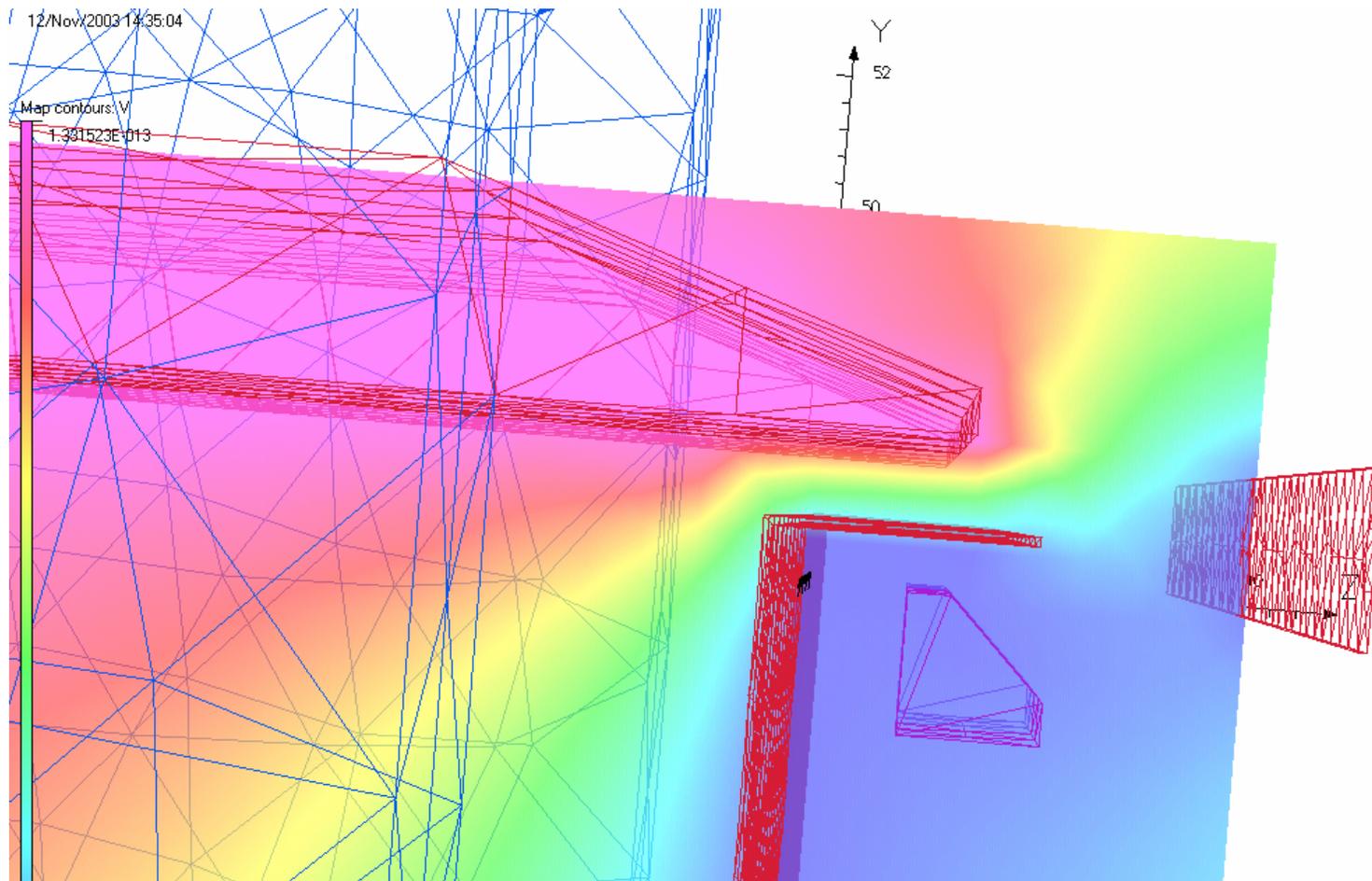


Electron Current Density

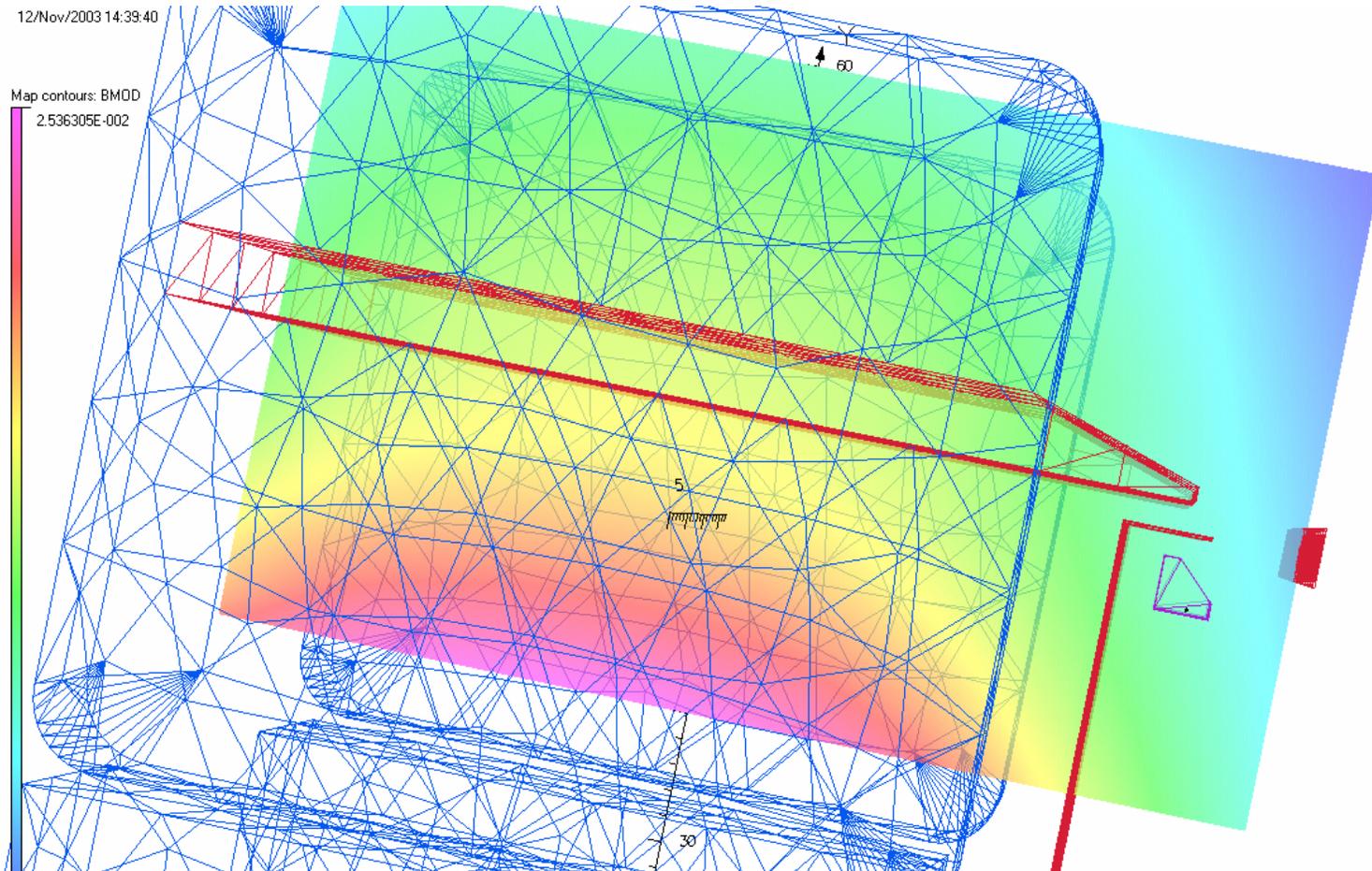
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Electric Field Distribution



Magnetic Field Distribution





Conclusions

- **The combination of gradient electric and magnetic fields near the filament is a key to beam transport and focusing**
- **An electromagnet can be substituted for the permanent magnet in a commercial egun**
- **It is very likely electron beam heating can be used to make thin Li films in NSTX**