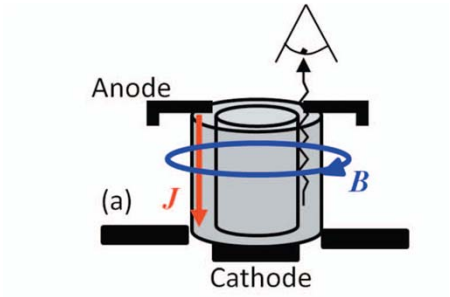
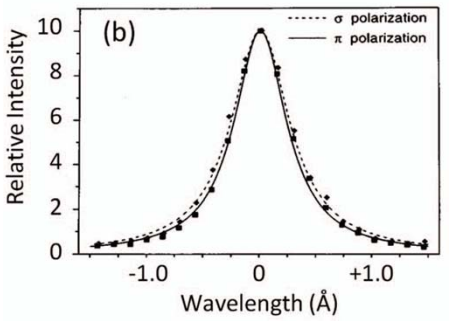
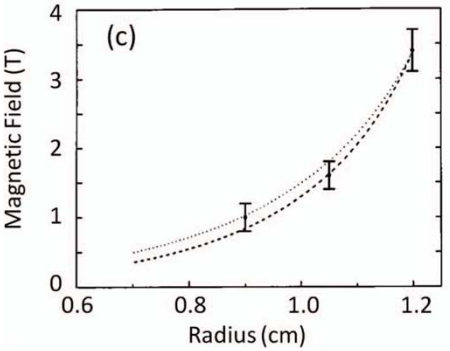
Spectroscopic measurements of the Zeeman and Stark effects have been made on pulsed power machines in the past



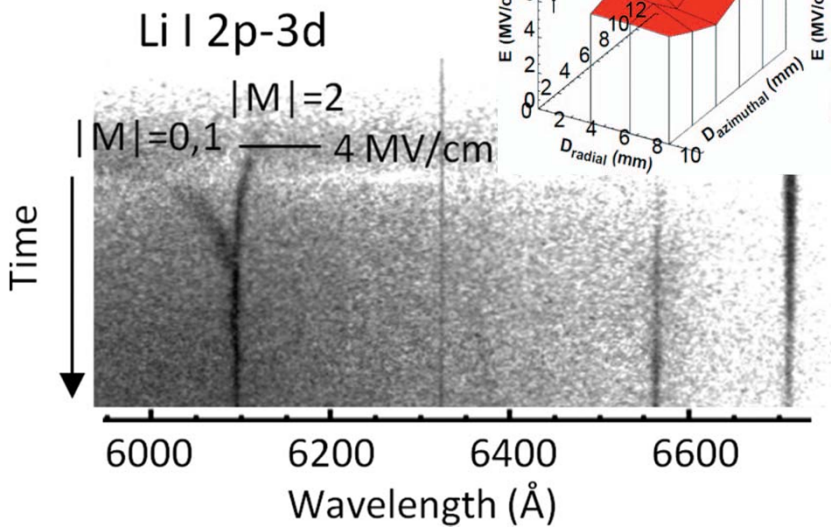


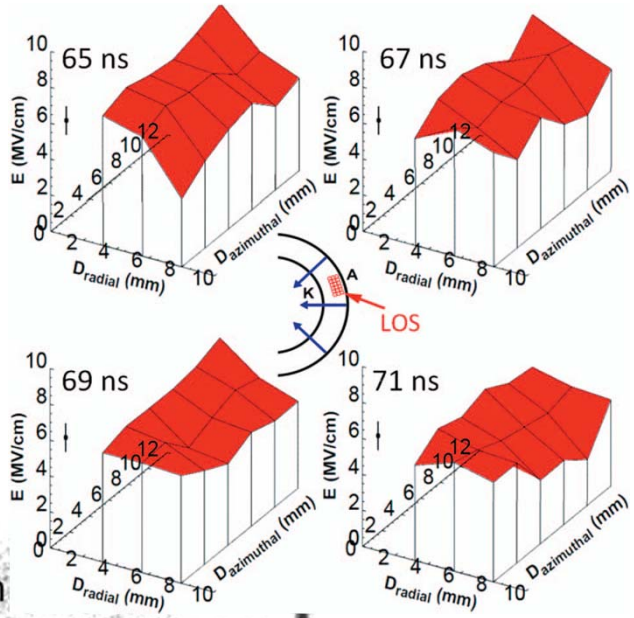


Determine dopant with:

- prominent line in our spectral range
- sufficient Zeeman splitting at the expected fields.

Streaked spectrum would give time resolved measurement of the B-field





Images courtesy of Rochau et al. Phys. Plasmas, 2010.

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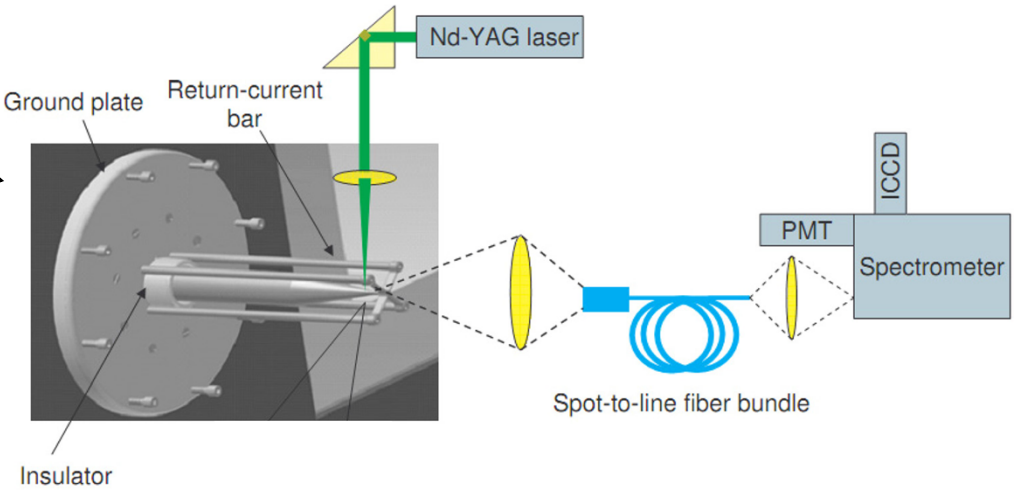
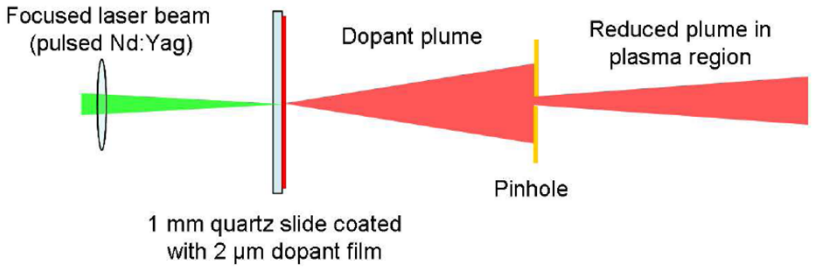
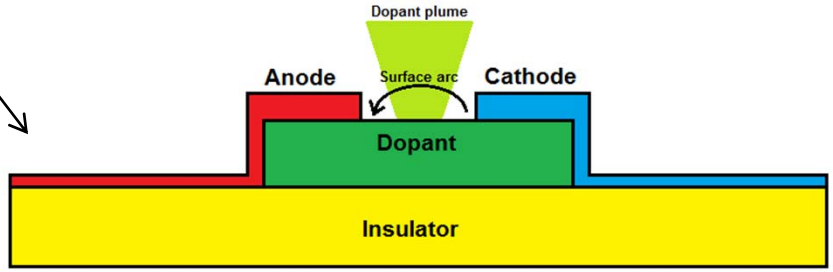
Various doping techniques have been developed to deliver the tracer element to the desired location in the correct quantity at the correct time.

- Laser evaporation
- High speed gas injection
- Surface flashover doping
- Optimized laser blow-off







Images courtesy of Boaz, PhD Thesis and Tessarin et al. Phys. Plasmas, 2011.

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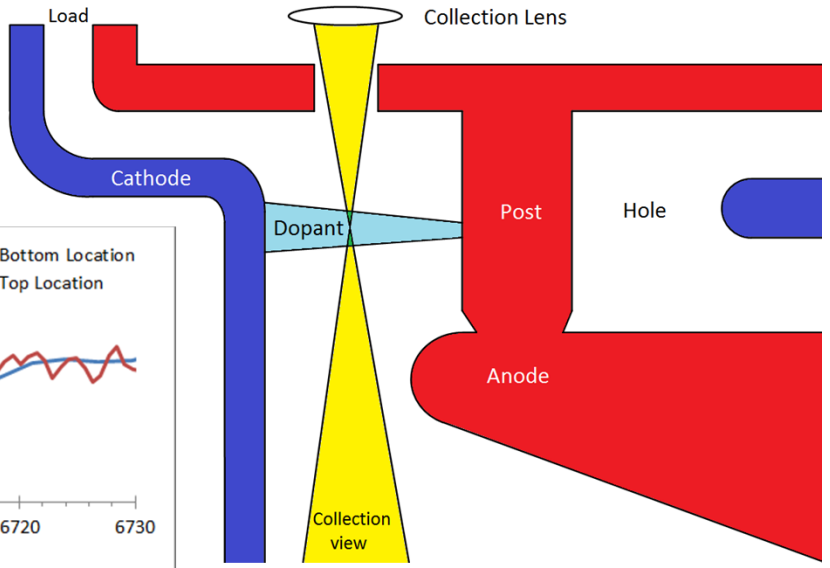
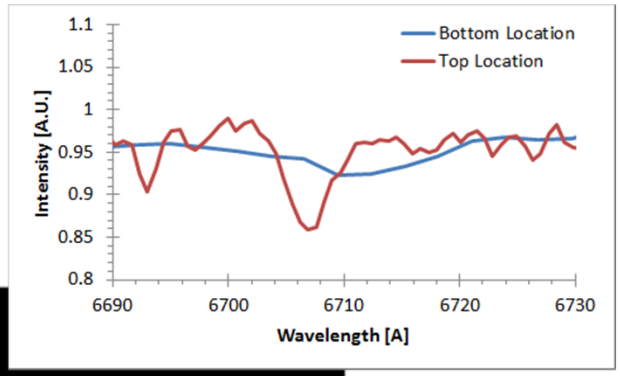
Spectroscopic studies of the convolute utilizing dopants are currently underway.

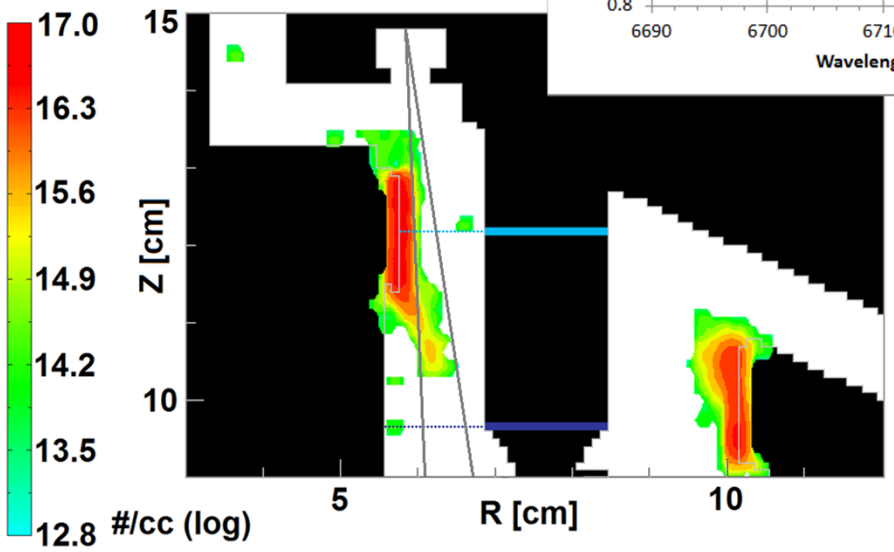
Dopants were used to axially bound the location of the continuum emission source

Finite plasma propagation time limits observations to late time dynamics

Active doping systems are being designed







Experiments in March will attempt to measure B-field splitting in Al-III 4p→4s transition (up to 5 Tesla). C-IV 3p→3s transition can be used for higher fields.

Experiments in June will attempt to measure E-field shifting/splitting in Li-I transitions at 6708 A and 6104 A (1-10 MV/cm)

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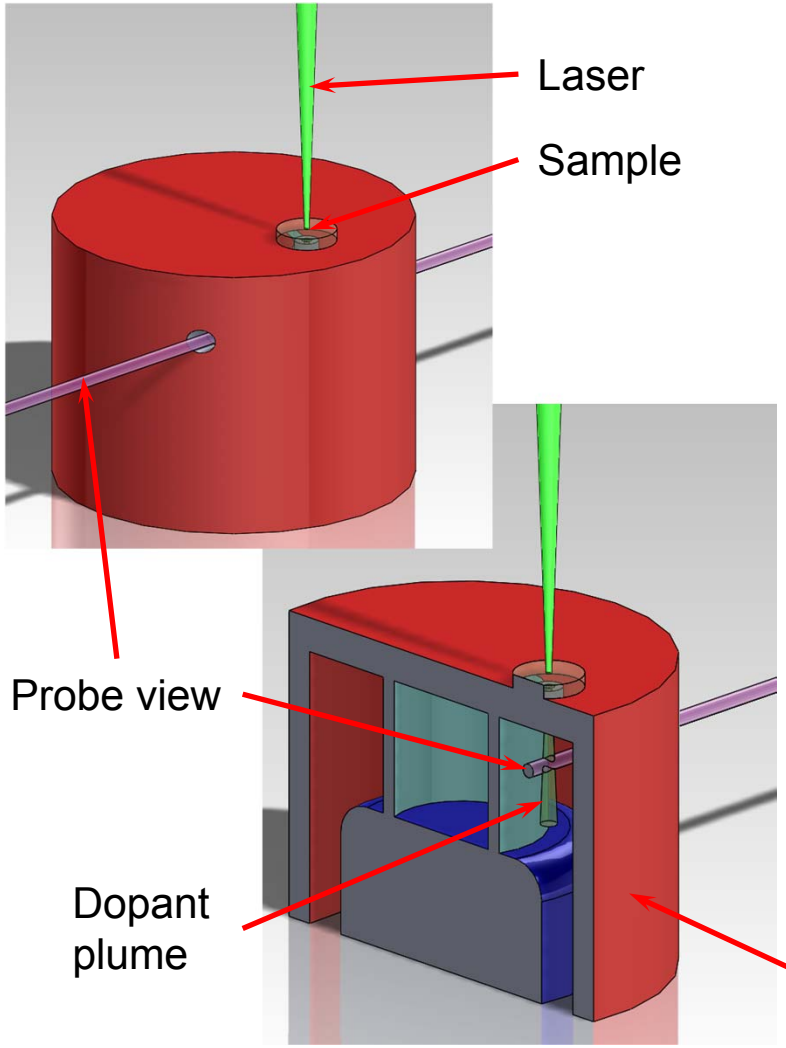
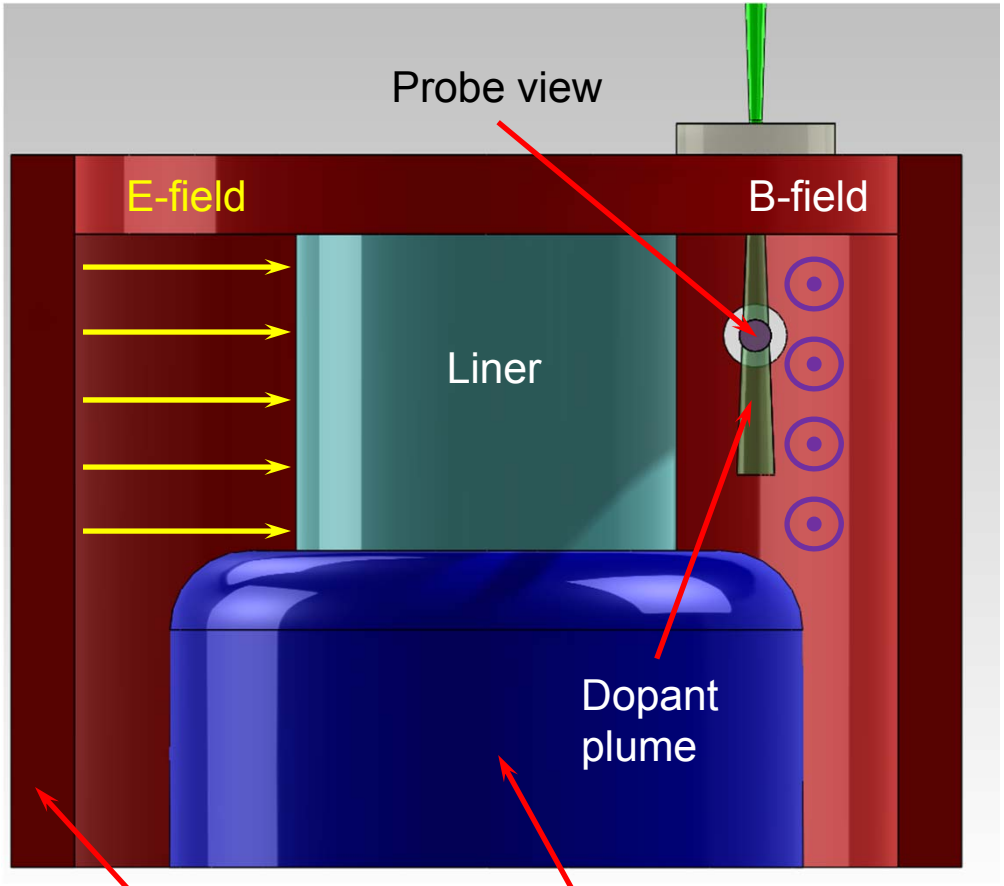
Optical spectroscopy could be used to diagnose the E- and B-fields in MagLIF relevant plasmas





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