Periodic structures controlled by a magnetic field

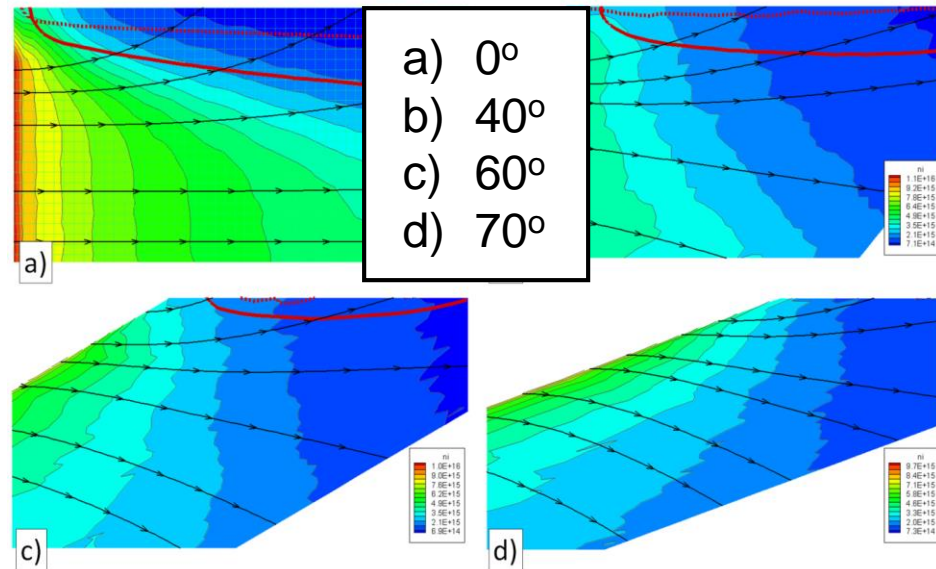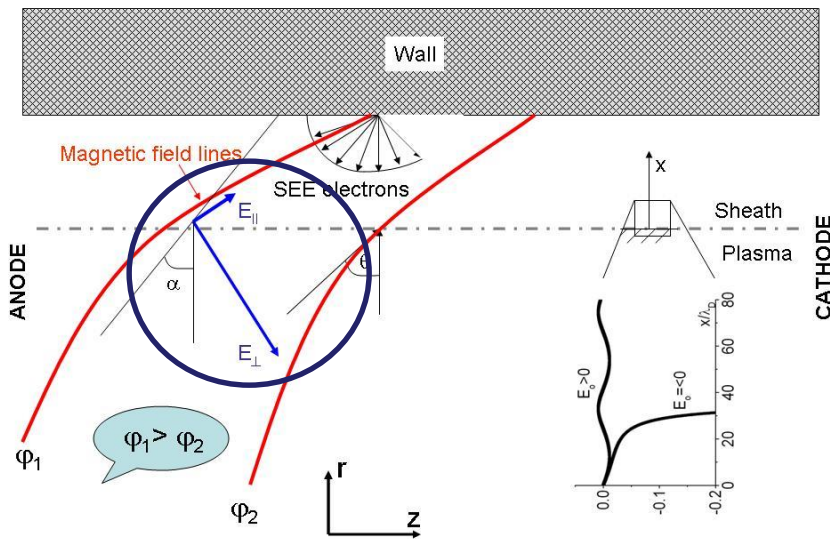Michael Keidar, Lubos Brieda, Irina Schweigert

George Washington University, Washington DC
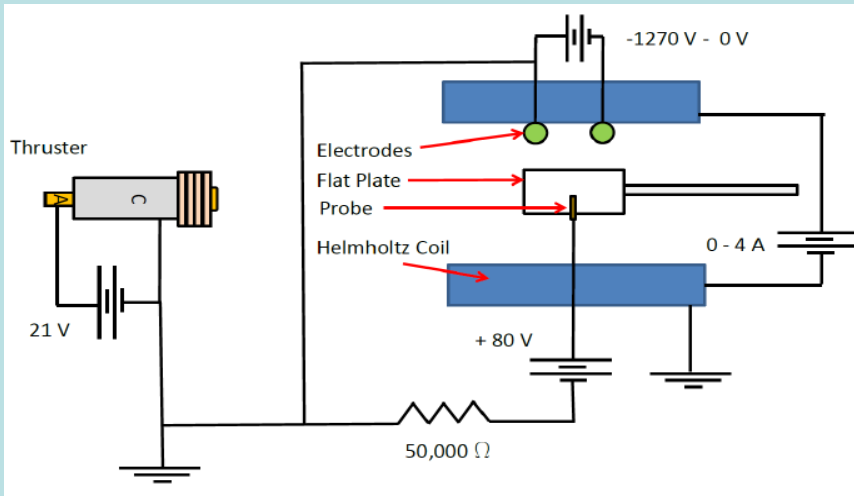*Particle-in-cell Consulting, LLC*

Sheath in oblique B

In ExB discharges electric field is "applied externally" for sheath problem

$$E_\parallel = T_e \partial \ln n / \partial r \sim T_e / \Delta r \sim 20 eV / 0.01 cm \sim 2 \times 10^3 V/m$$

$E_{perp} \sim 2 \times 10^4 \ V/m$
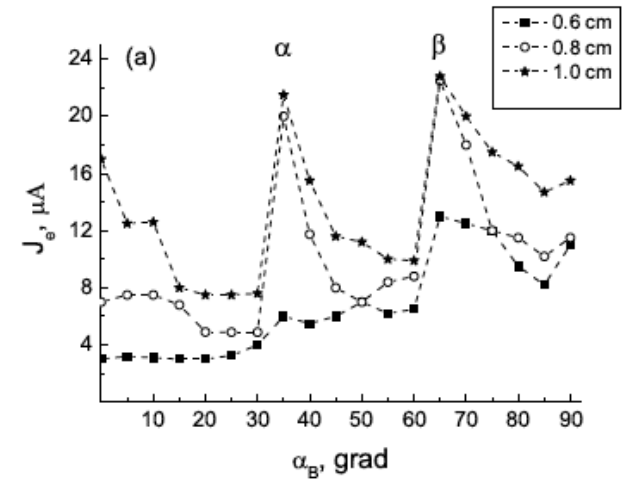

a) 0º
b) 40º
c) 60º
d) 70º

Keidar, & Beilis, *Appl. Phys. Lett.*, 2009, Brieda & Keidar, J. Appl. Phys., 2012
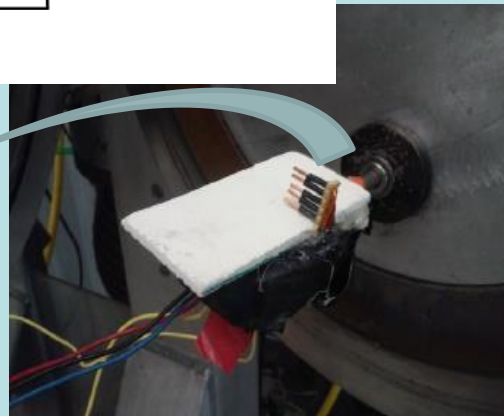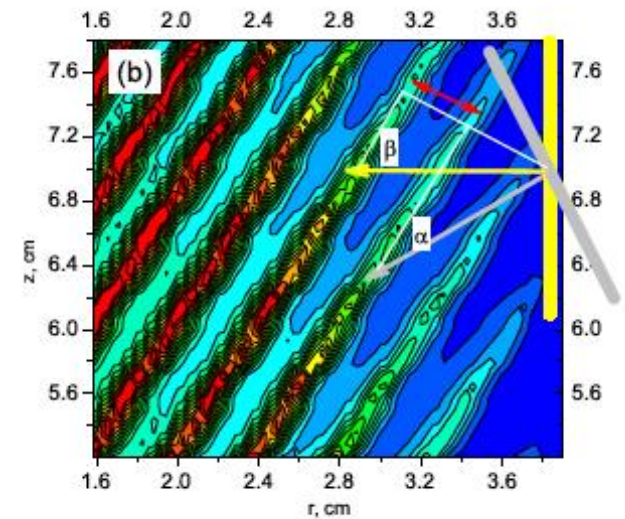
Experiment observations

Periodic structure

Simulations

Kinetic simulations

Scaling ~ Larmor radius

★ 2.5 eV, 100 G
△ 2.5 eV, 50 G
■ 5 eV, 100 G
○ 5 eV, 50 G
● 2.5 eV, 25 G

Schweigert & Keidar, Plasma Sources Sci. Technol. 26 (2017) 064001