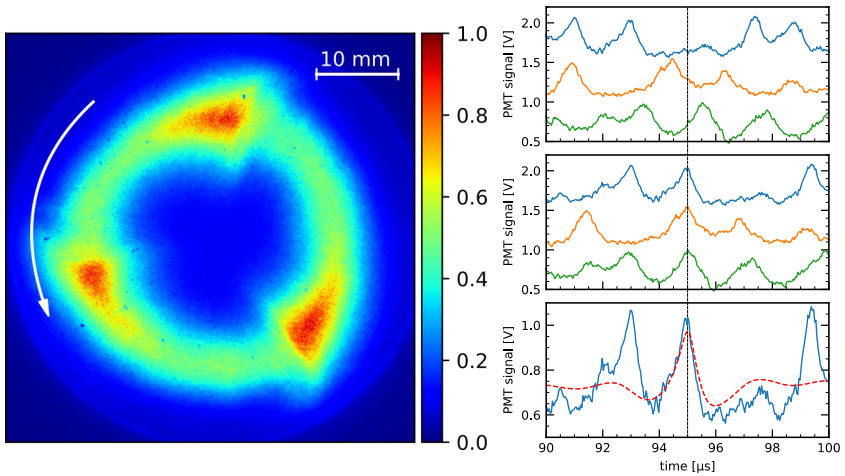
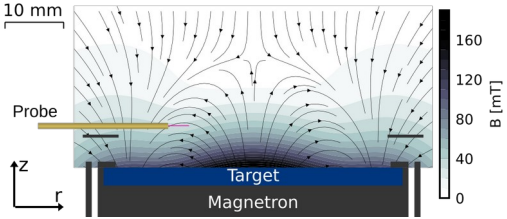
Setup





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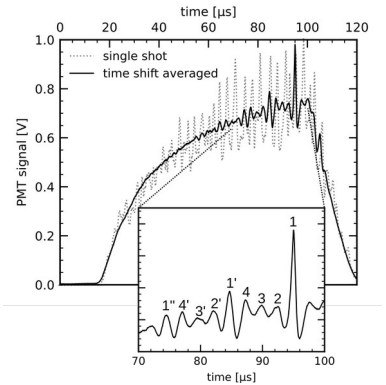

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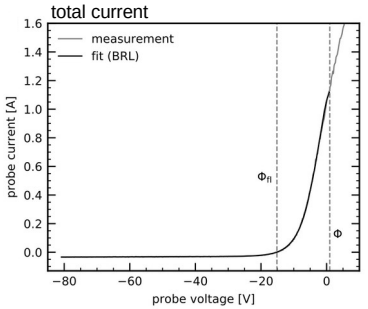
Probe current fits



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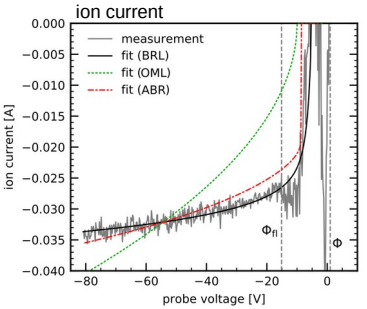
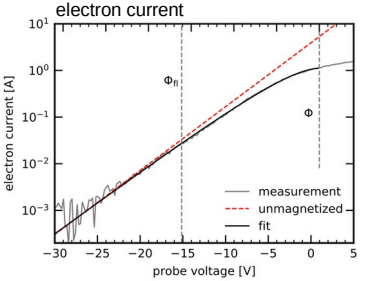
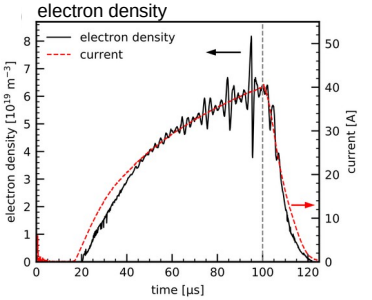
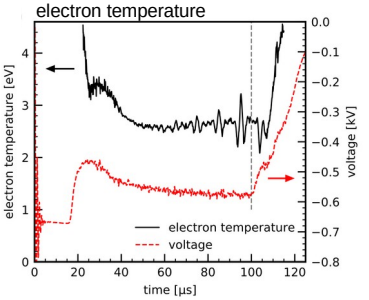




Results





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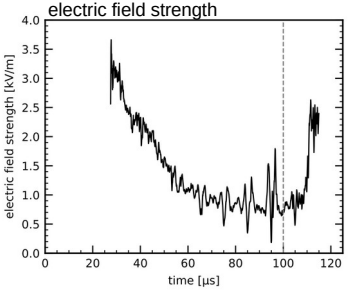

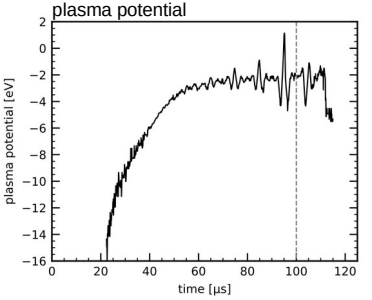

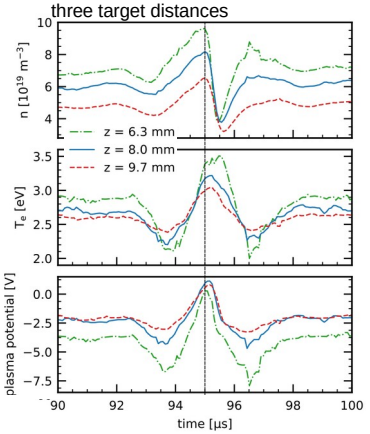

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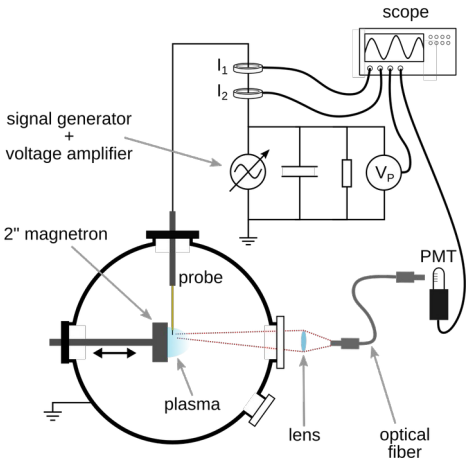

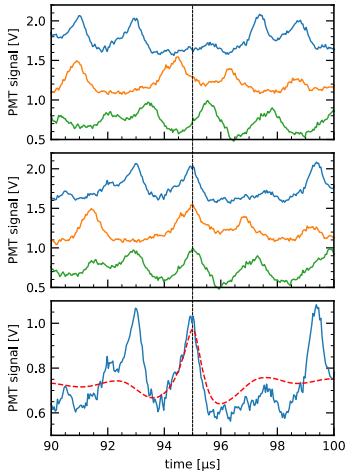

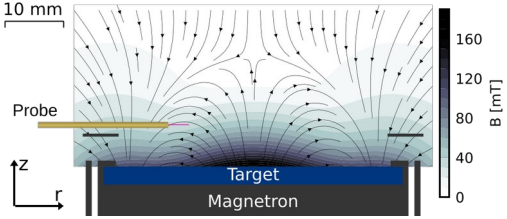

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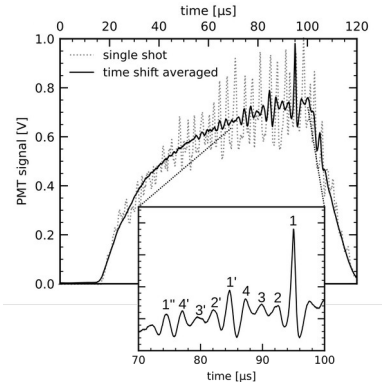

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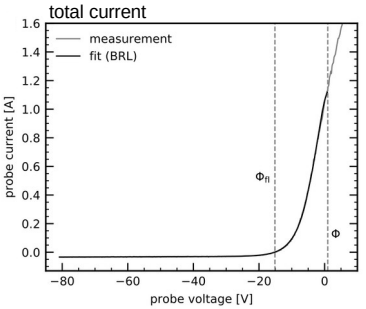

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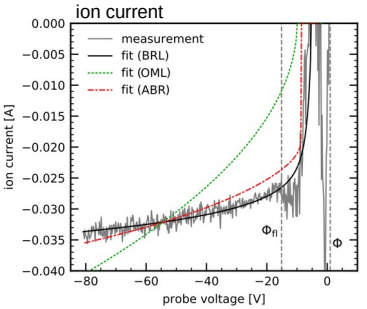

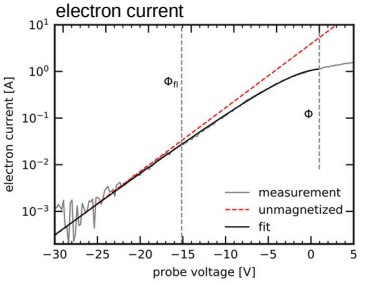

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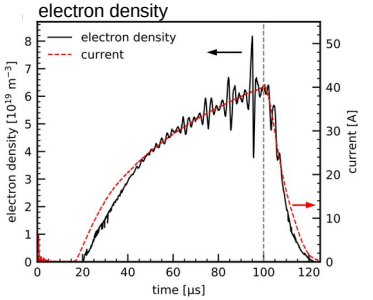

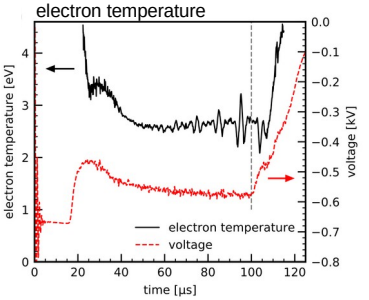

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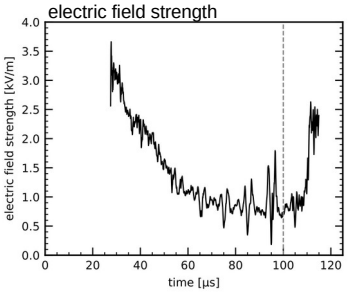

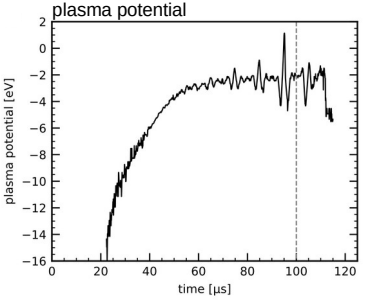

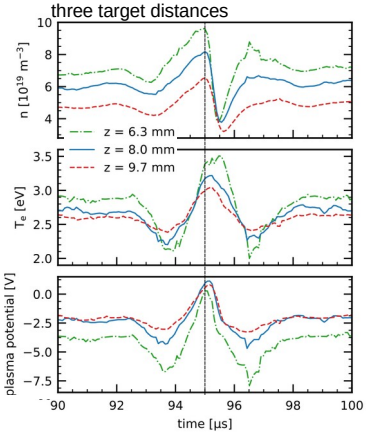

- Electron density fluctuation asymmetric like the spoke shape
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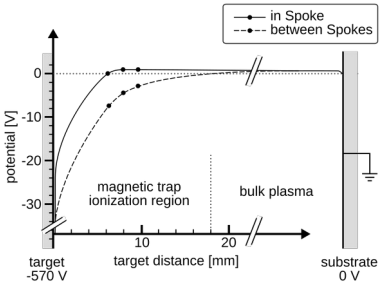
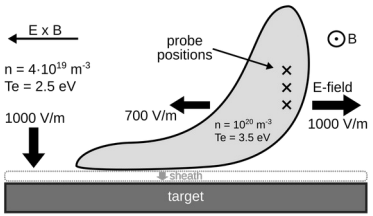
Spoke Electric Field

- Electric field inside the spoke is strongly reduced
- Ions may diffuse freely towards the substrate
- No potential maximum (in z direction)
- Strong electric field in azimuthal direction
- Azimuthal potential hump of ~ 10 V





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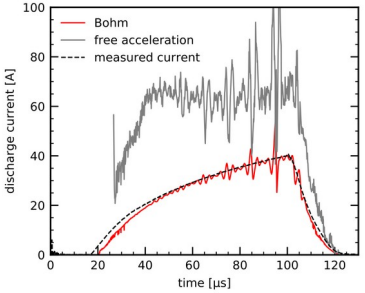
Discharge Current

- Probe measurements can be used to explain the discharge current
- Two possibilities for ion speed at the sheath edge:
  - ➔ Bohm (usual plasma)
  - ➔ Acelleration in electric field (IRM)

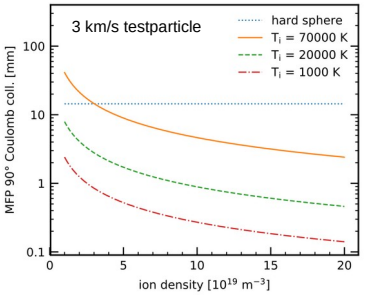
$$I_{\mathrm{Bohm}} = v_{\mathrm{B}} n_{\mathrm{e}} A e = \sqrt{\frac{k_{\mathrm{B}} T_{\mathrm{e}}}{M}} n_{\mathrm{e}} A e$$

$$I_{\mathrm{E}} = v_{\mathrm{E}} n_{\mathrm{e}} A e = \sqrt{\frac{2Es}{M}} n_{\mathrm{e}} A e$$

$$A = 0.7 \cdot 20\,\mathrm{cm}^2 \qquad s = 8\,\mathrm{mm}$$



- What is slowing down ions?
  - ➔ Charge exchange (ion-neutral) [1]
  - ➔ Coulomb collisions (ion-ion) [2]



Spoke OES