



Current Sheath Dynamics and its Evolution Studies in Sahand Filippov type Plasma Focus (SPF)

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Experimental setup

I. SPF

Capacitor bank: 288 μF

Maximum energy: 90kJ

Working voltage: Until 25kV

Typical current peak: $\geq 1\text{MA}$

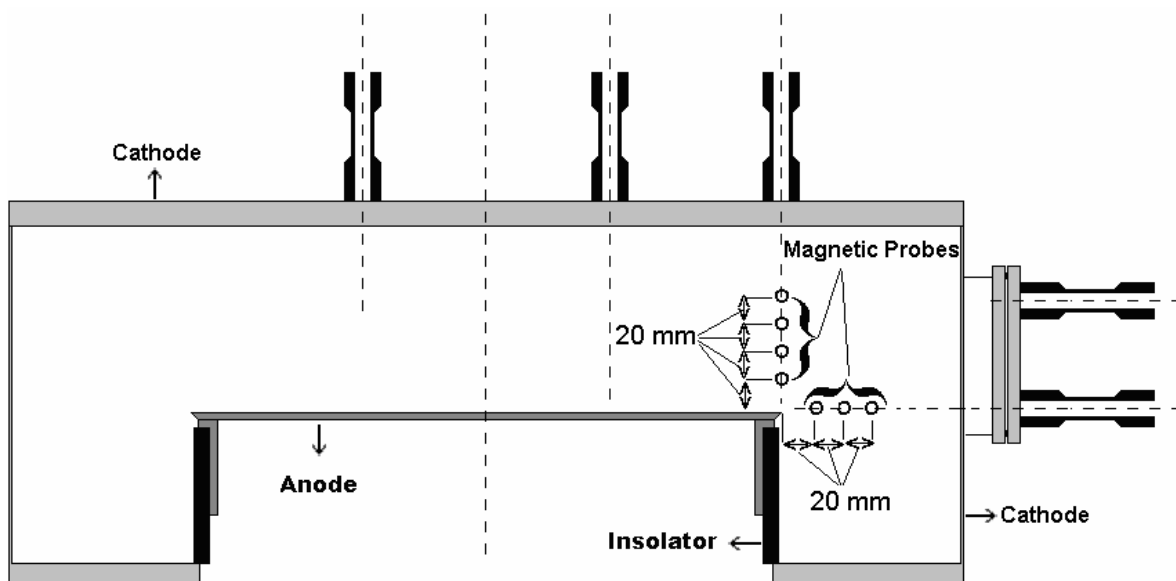
Range of working pressure: 0.1-5 Torr



II. Diagnostics

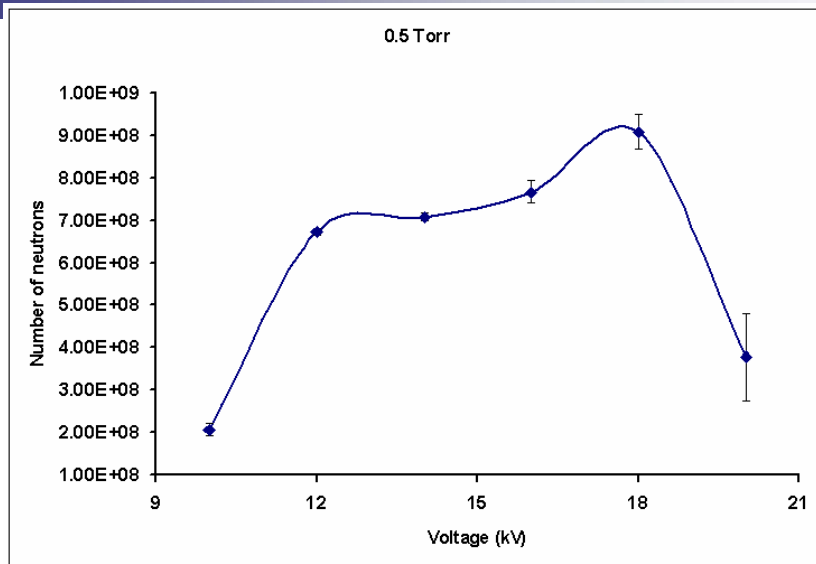
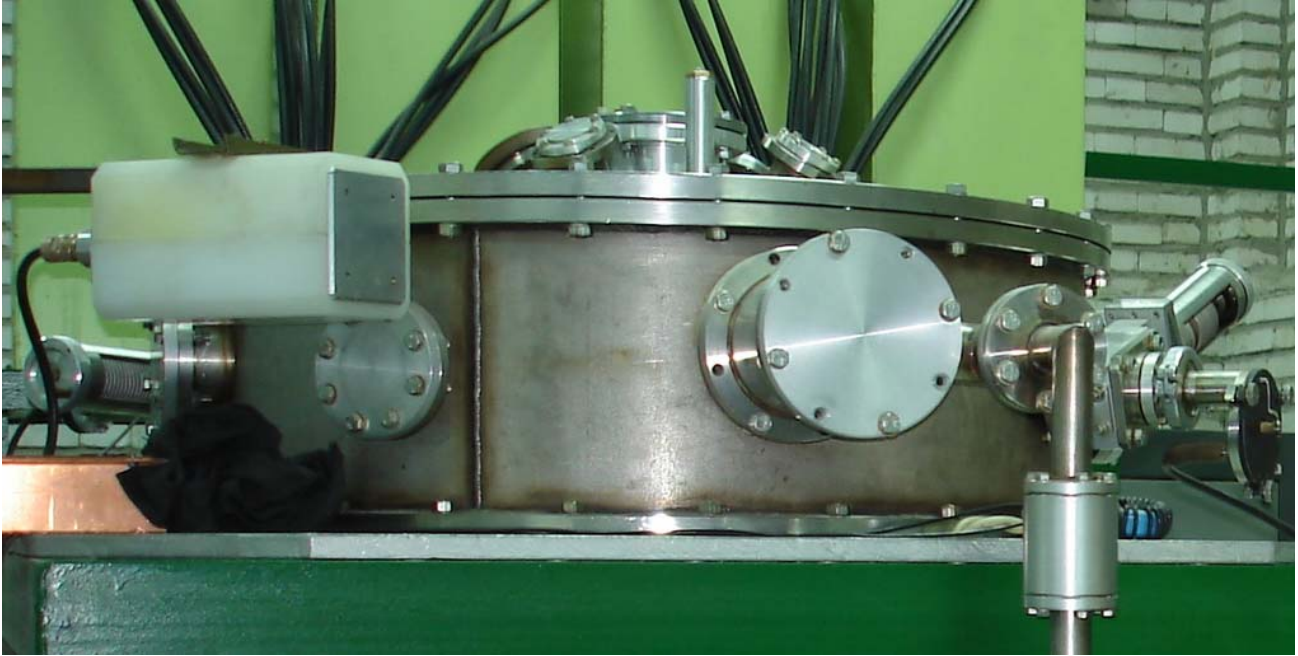
- Rogowski coil
- GM neutron counter
- Pinhole camera
- Semiconductor detector (Soft X-ray)
- Vacuum photodiode (Hard X-ray)
- Photomultiplier with NE-102 plastic scintalator
- Magnetic probes

III. Setup



IV. Results

■ Neutron yields

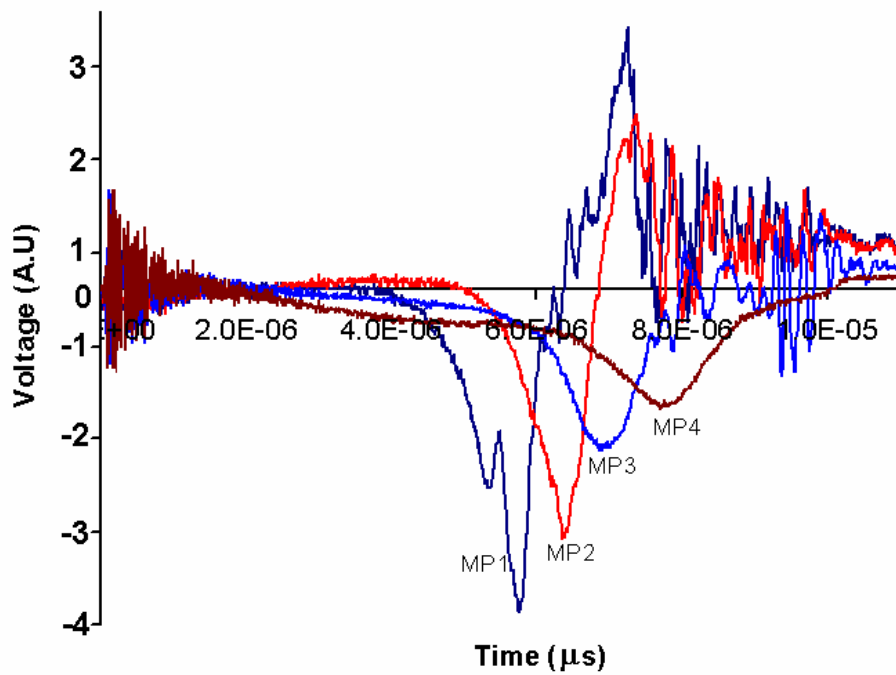


1 Torr D₂+%3Kr

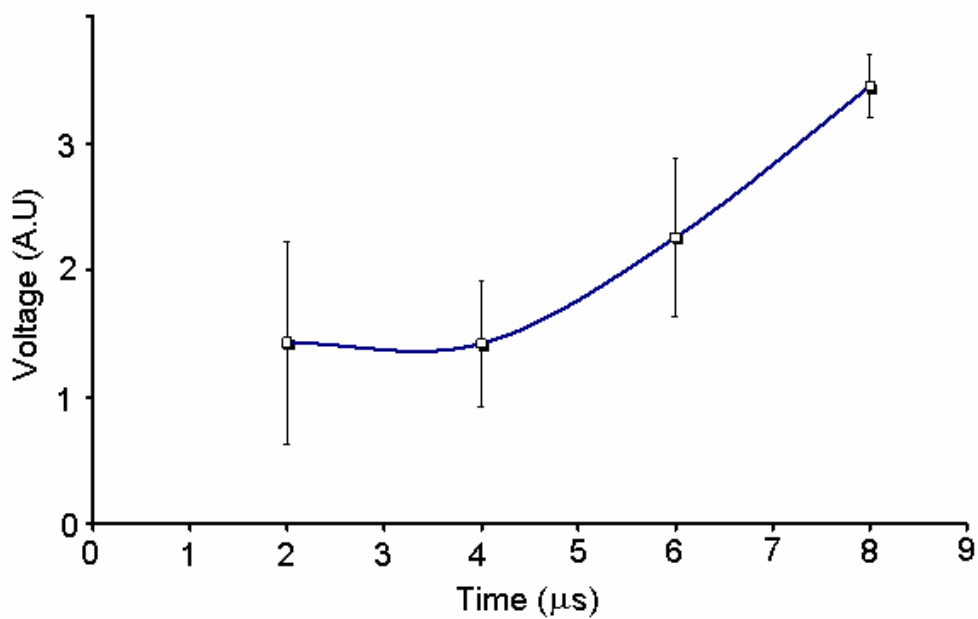
Voltage (KV)	Y_n
16	1.8×10^9
18	2.67×10^9

Maximum neutron with SPF

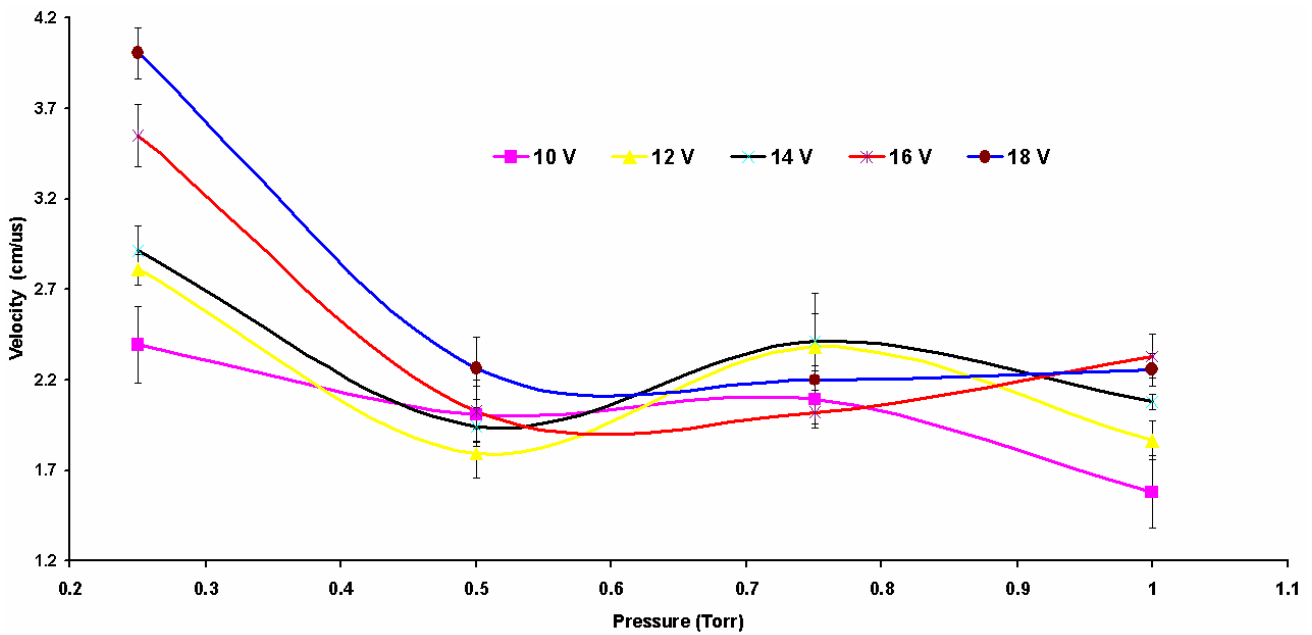
- Magnetic probes



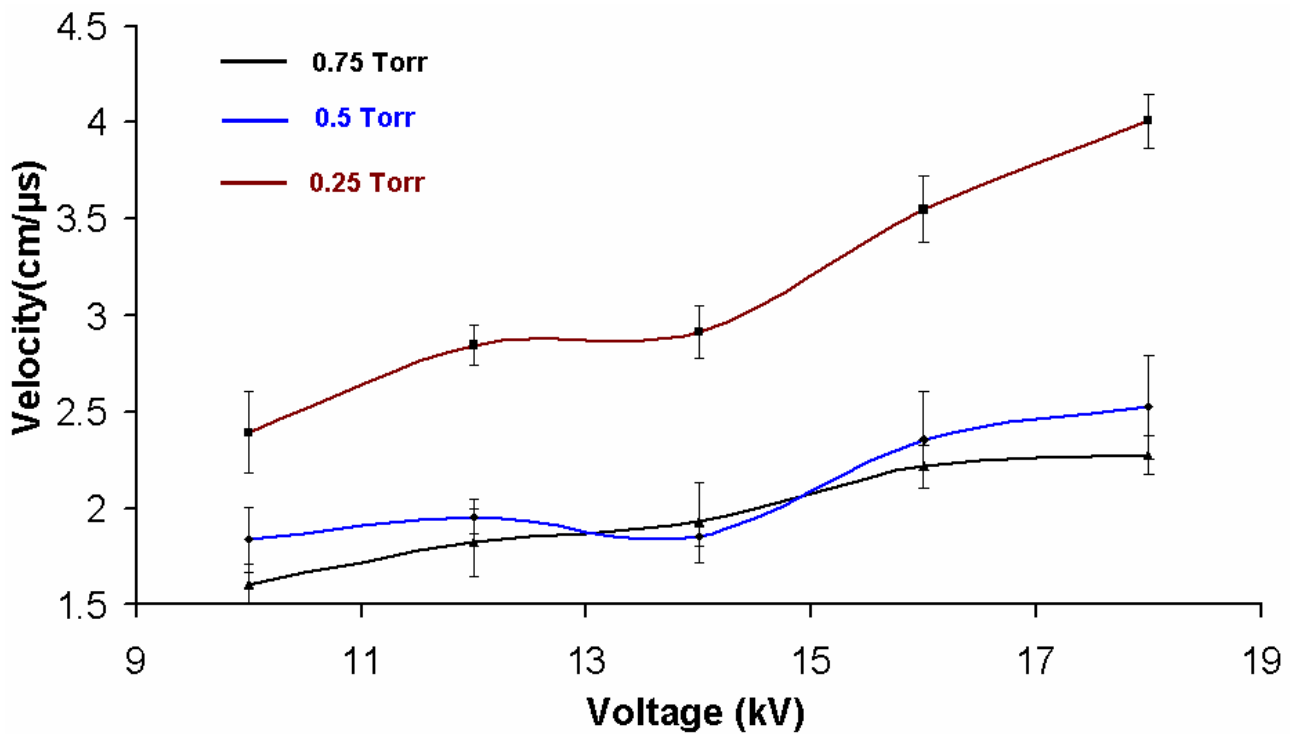
- Broadening of current sheath



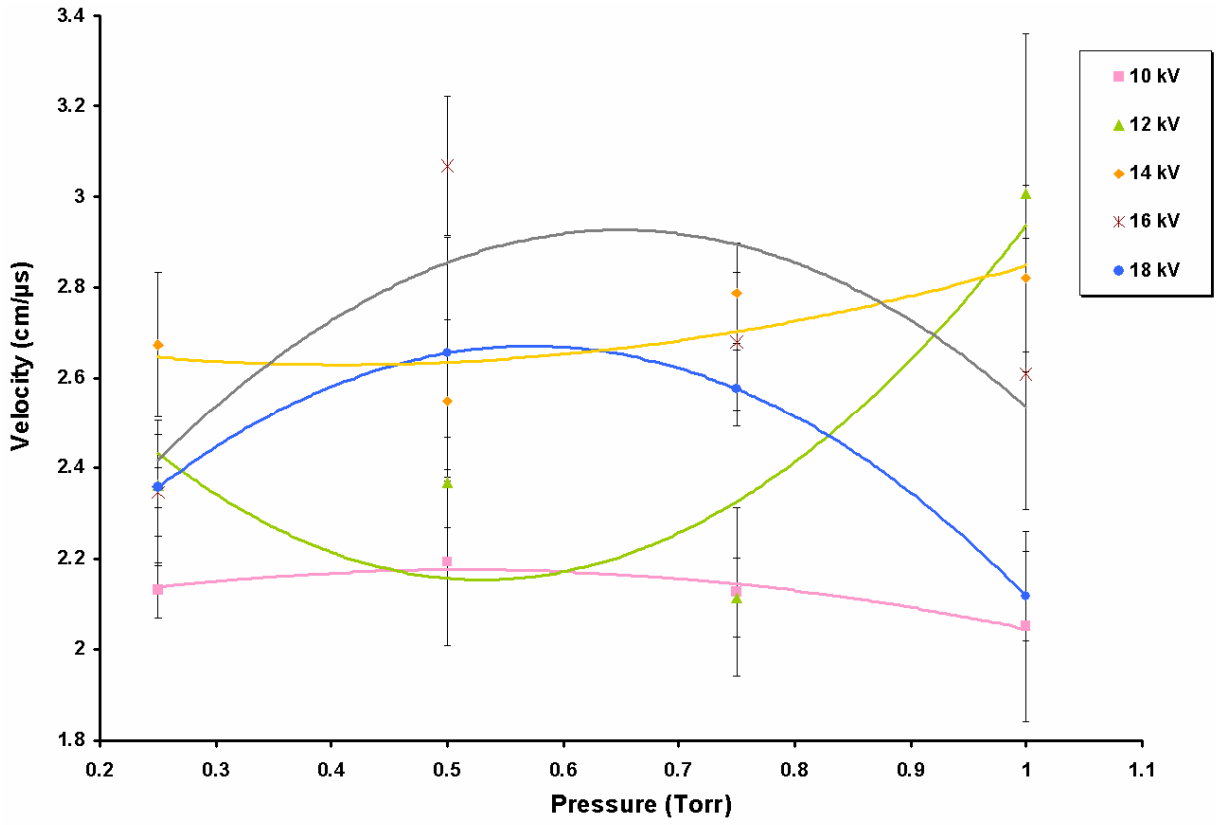
■ Current sheath velocity at different pressure
(Axial Phase)



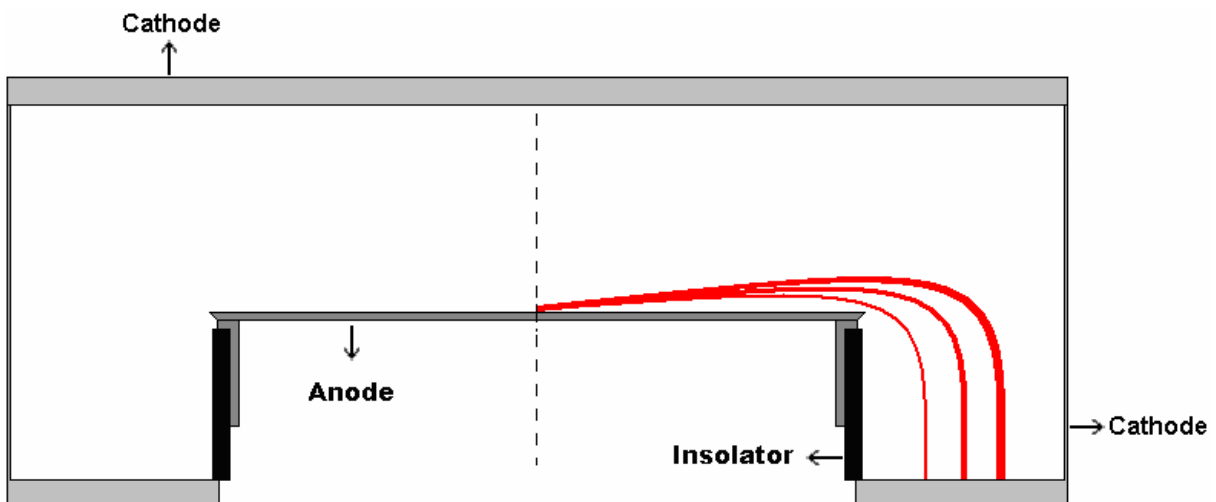
■ Current sheath velocity at different voltage
(Axial Phase)



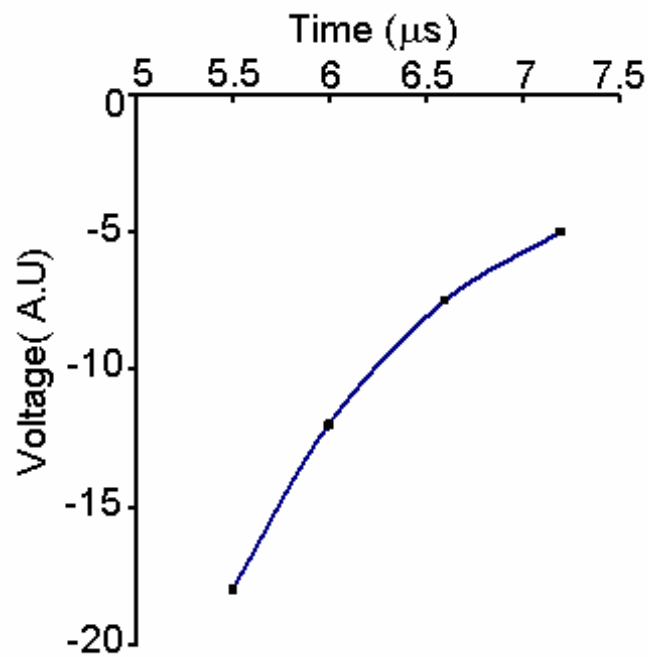
Current sheath velocity at radial phase



Current sheath profile



- Peak amplitude



V. Conclusion

- At higher pressure the velocity of current sheath is decreasing
- The amplitudes of signals produced by MP at higher distance of anode surface are smaller
- It is found that at higher distance from anode surface, the current sheath width is bigger



Thanks