FIGURES

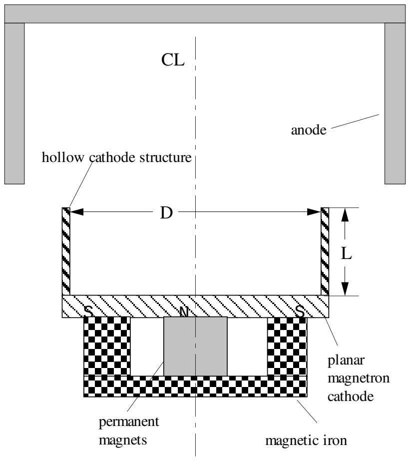


FIG. 1. A HCM configuration with definition of cathode length L and diameter D.

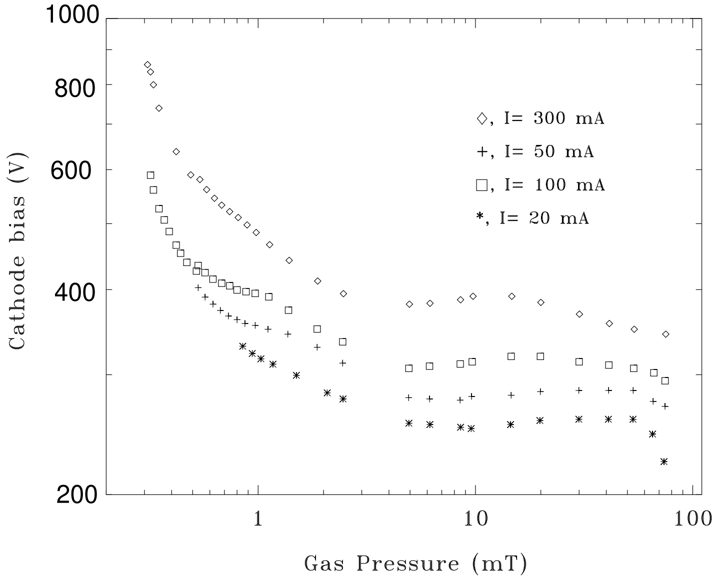


FIG. 2. VP curves for fixed cathode currents. $L = 10.8$ cm, $D = 9.8$ cm, Ar discharge.

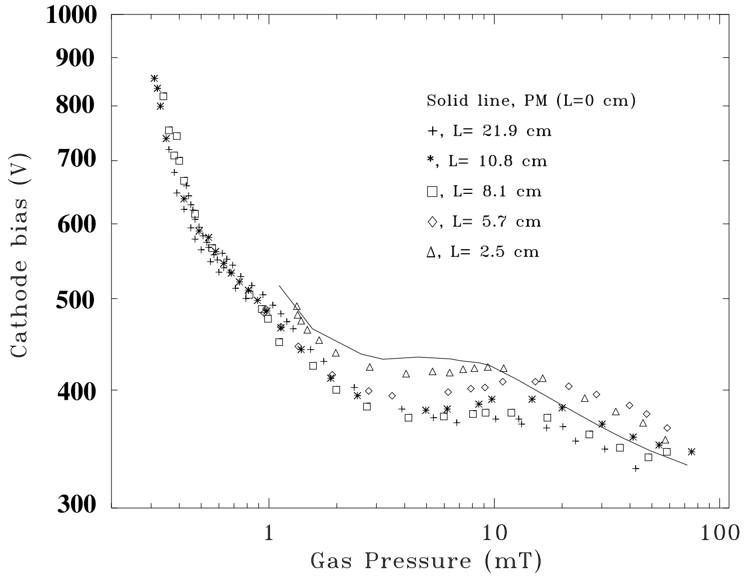


FIG. 3. Comparison of VP curves for D = 9.8 cm, Ar discharge, I = 300 mA.

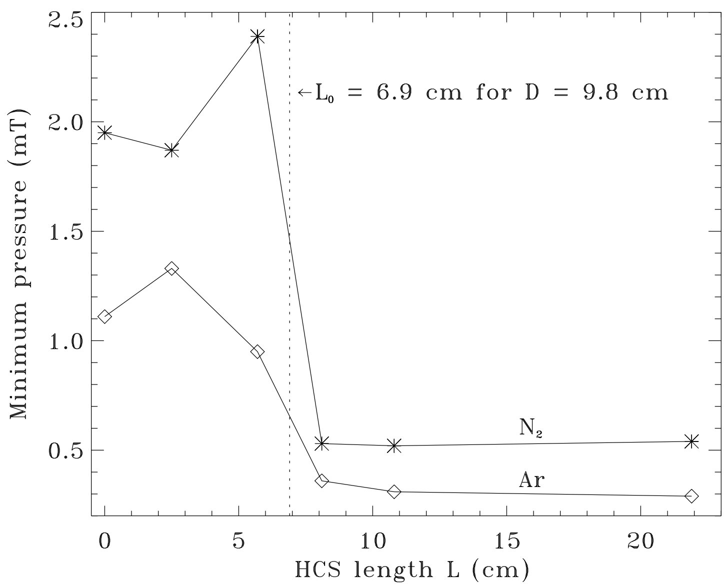


FIG. 4. A HCS critical length $L_0 = 6.9$ cm was found for both Ar and N_2 discharges when D = 9.8 cm. Cathode current I = 300 mA.

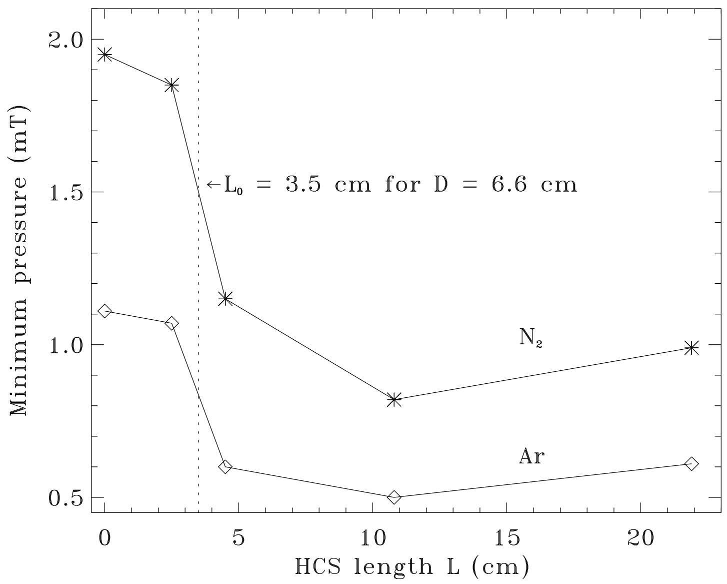


FIG. 5. A HCS critical length $L_0 = 3.5$ cm was found for both Ar and N_2 discharges when D = 6.6 cm. Cathode current I = 300 mA.

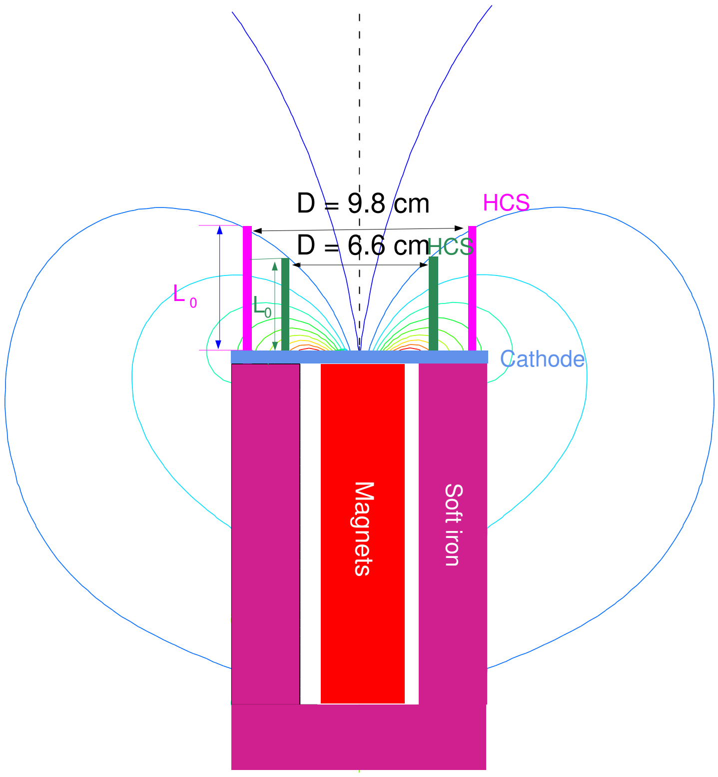


FIG. 6. Magnetic field configuration of the HCM.

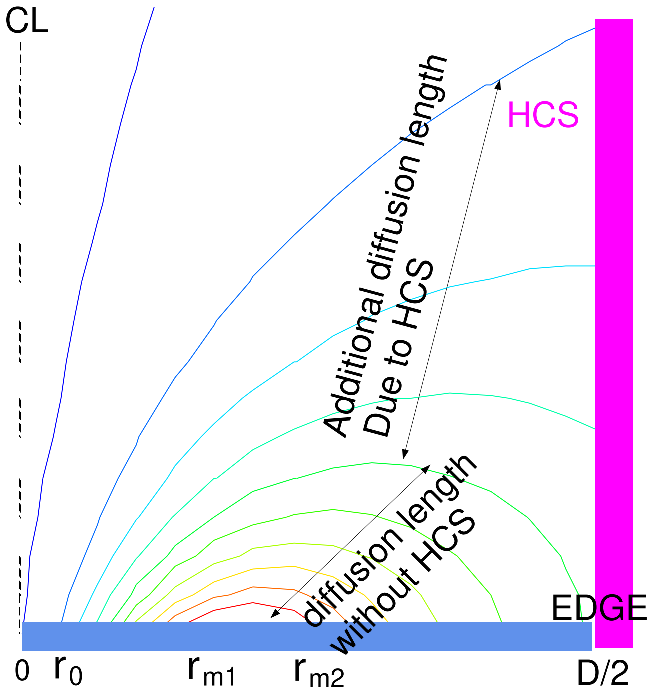


FIG. 7. Definition of different regions on the cathode surface.

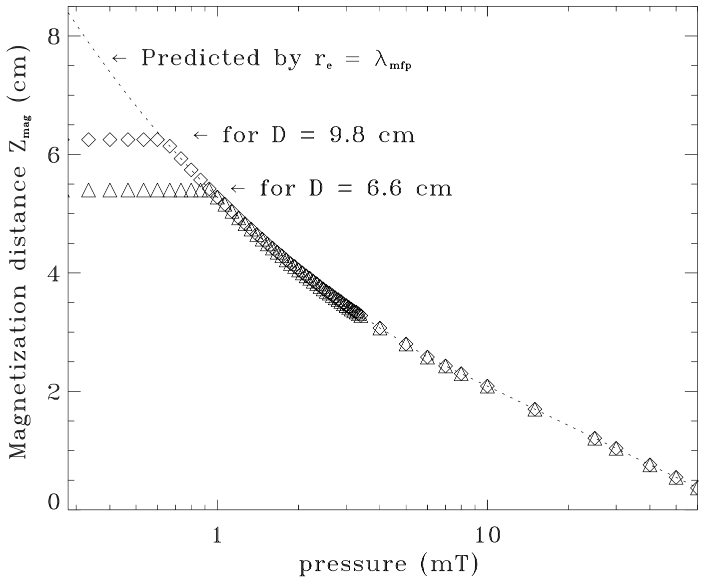


FIG. 8. Magnetization of energetic ...

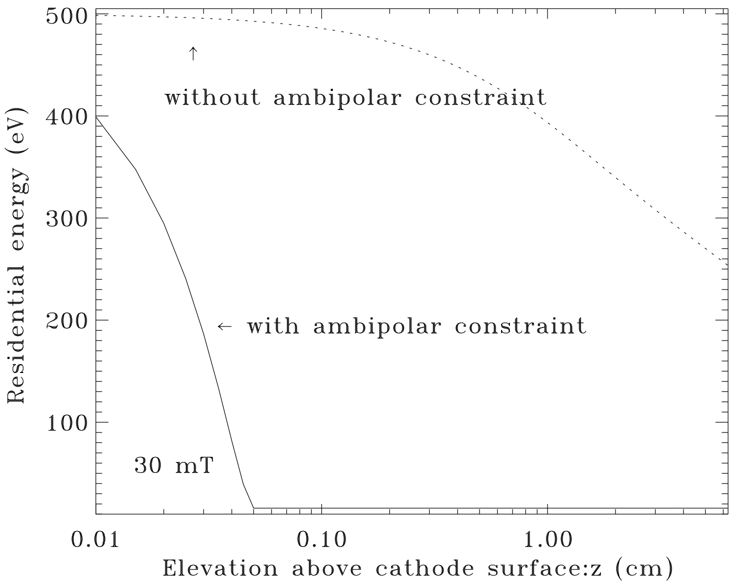
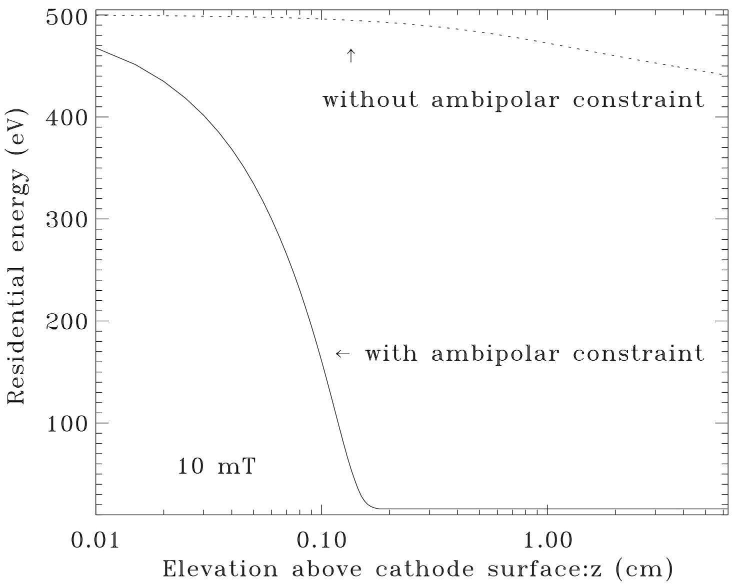
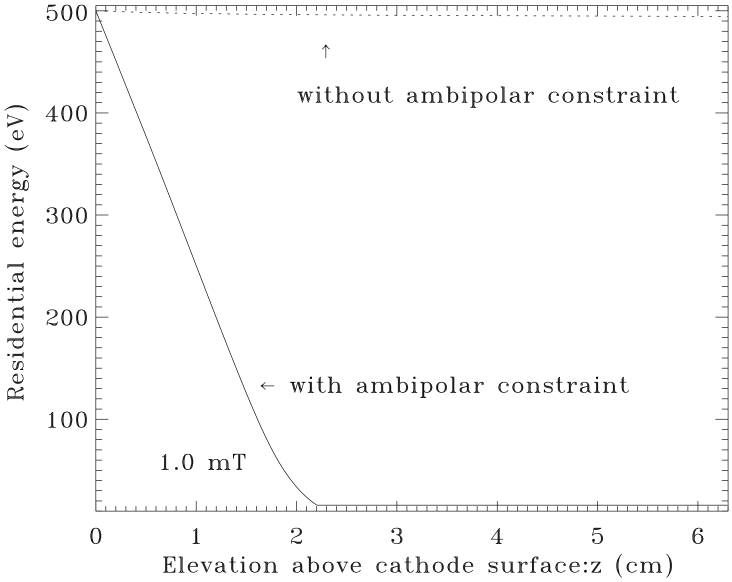
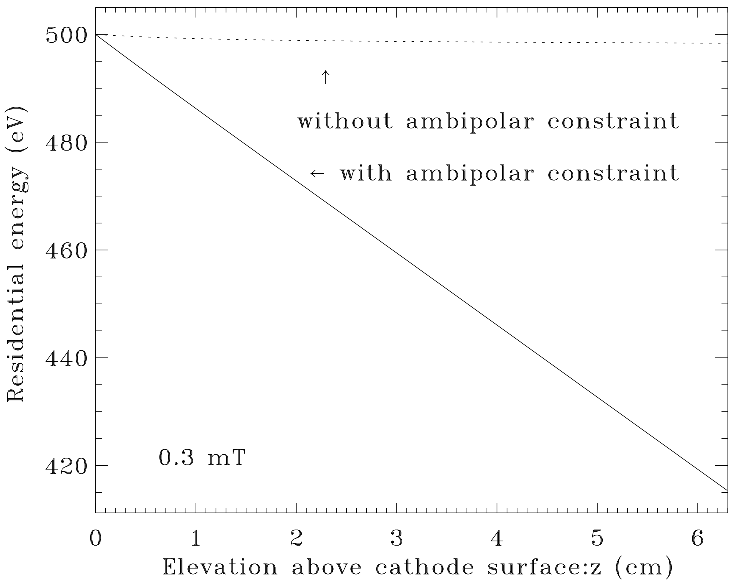


FIG. 9. 30 mT, 500 eV





500
400
300
200
100
Residential energy (eV)
without ambipolar constraint
← with ambipolar constraint
1.0 mT
0
1
2
3
4
5
6
Elevation above cathode surface:z (cm)



500
480
460
440
420
Residential energy (eV)
without ambipolar constraint
← with ambipolar constraint
0.3 mT
0
1
2
3
4
5
6
Elevation above cathode surface:z (cm)

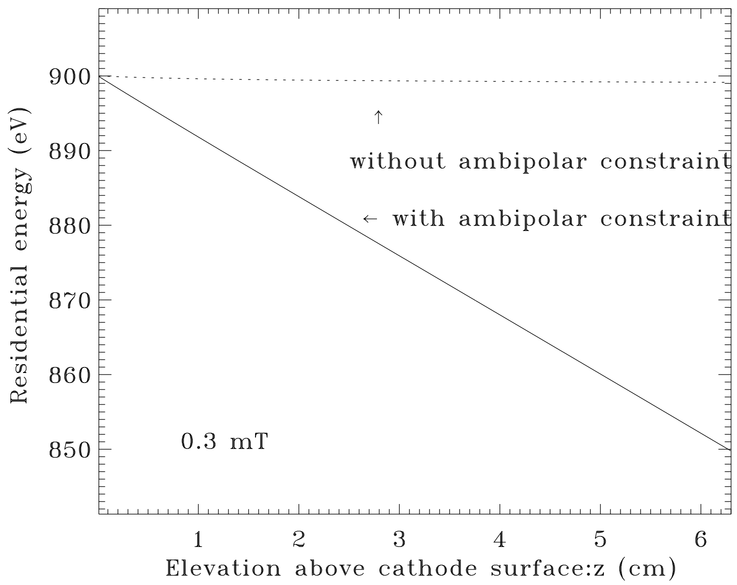


FIG. 10. Bohm, 0.3 mT, 900 eV

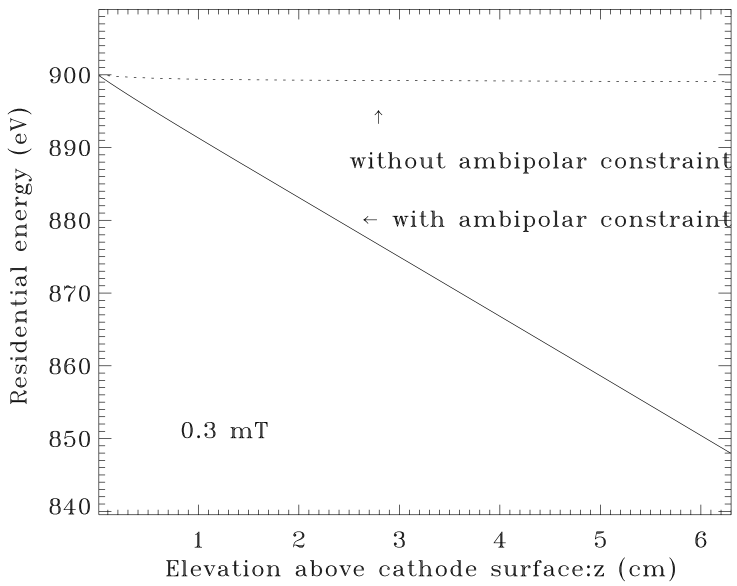


FIG. 11. collisional, 0.3 mT, 900 eV

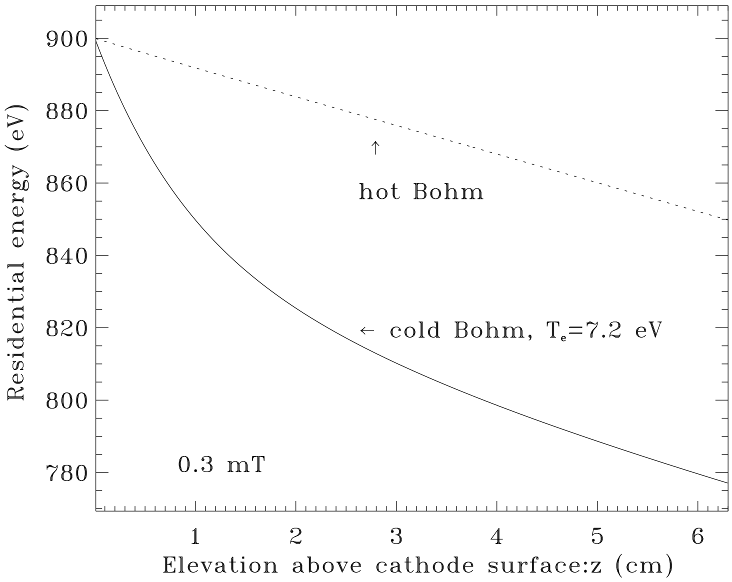


FIG. 12. cold Bohm, 0.3 mT, 900 eV

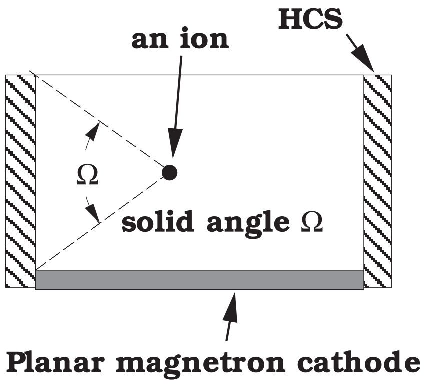


FIG. 13. Increasing utilization of ions in a HCM, due to a increase in solid angle of Ω, which is determined by the position where the ion is born, and the area of the HCS.

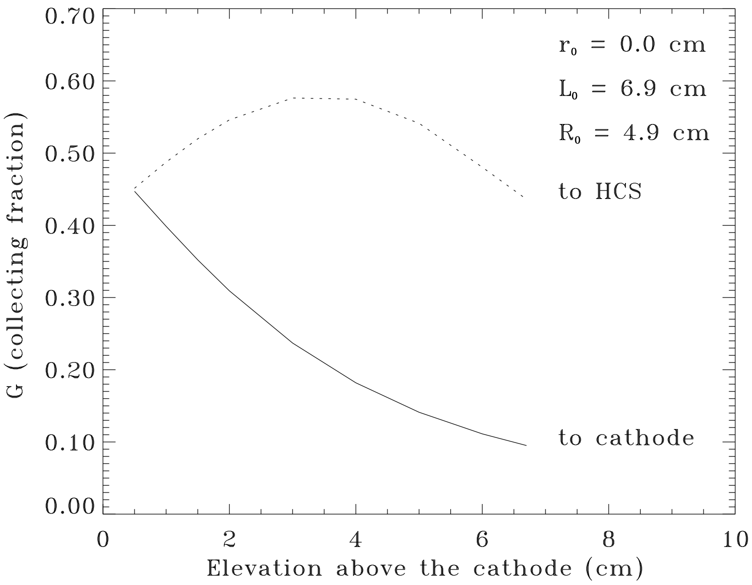
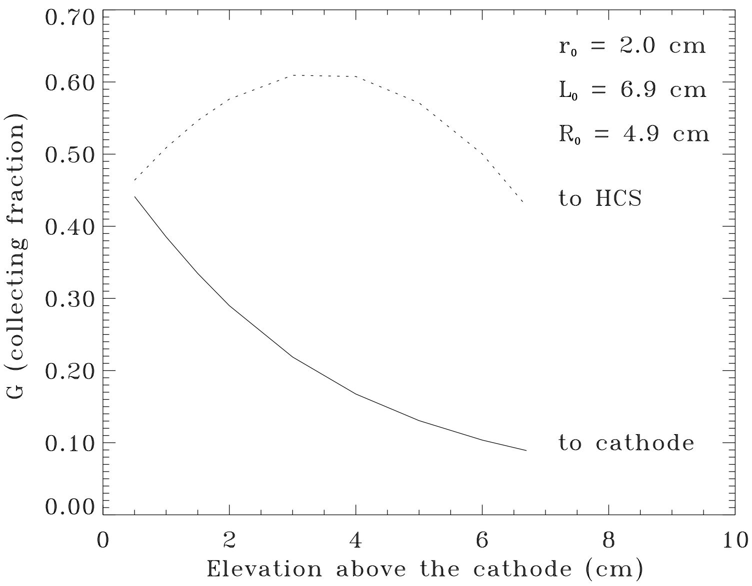
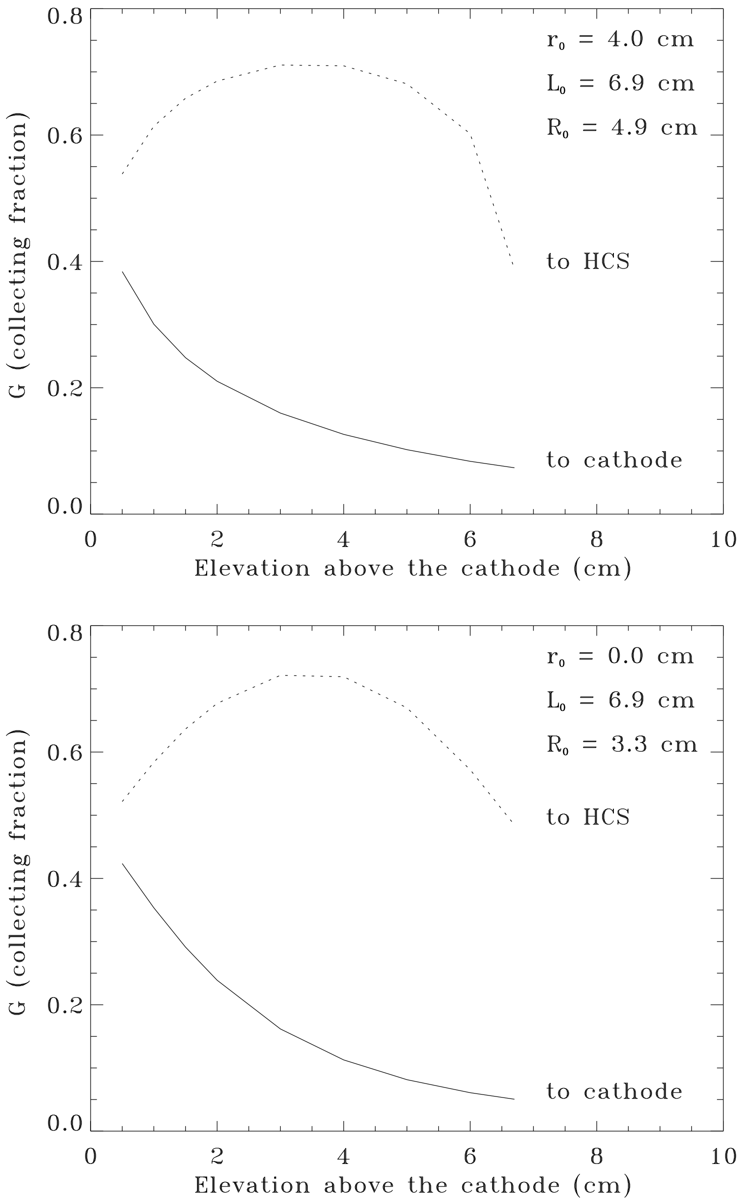
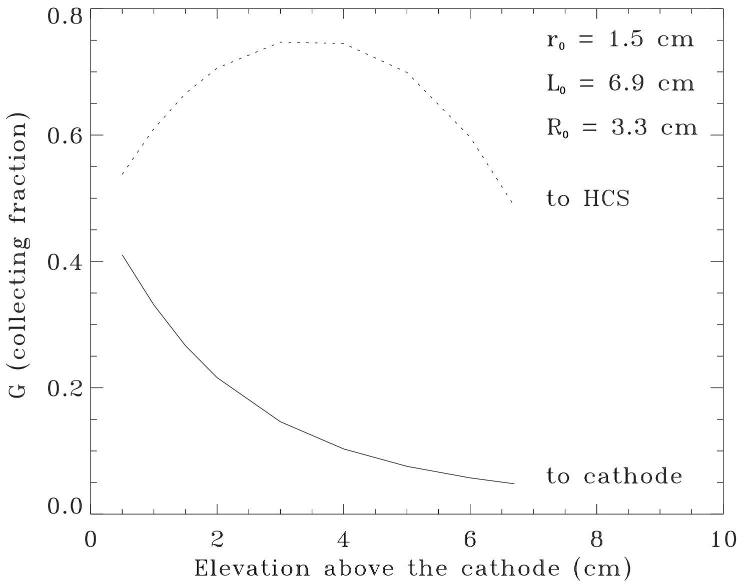


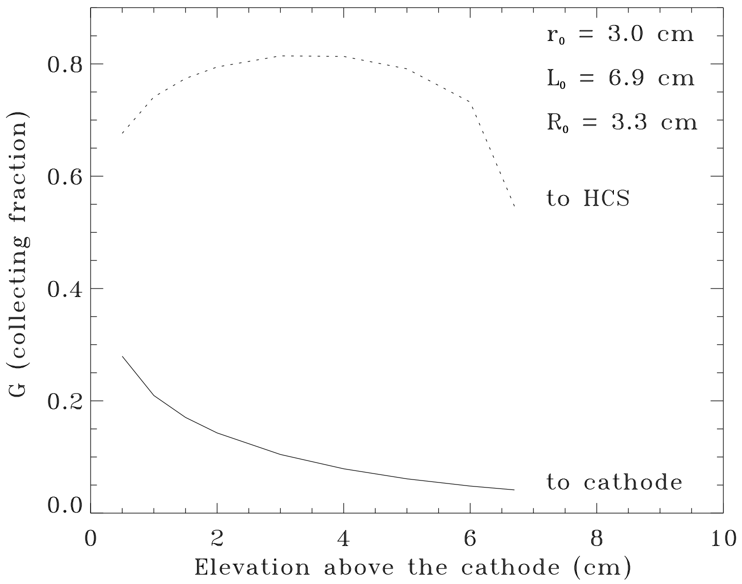
FIG. 14. collection efficiency





r_0 = 4.0 cm
L_0 = 6.9 cm
R_0 = 4.9 cm
to HCS
to cathode
G (collecting fraction)
Elevation above the cathode (cm)
r_0 = 0.0 cm
L_0 = 6.9 cm
R_0 = 3.3 cm
to HCS
to cathode
G (collecting fraction)
Elevation above the cathode (cm)


r_0 = 1.5 cm
L_0 = 6.9 cm
R_0 = 3.3 cm
to HCS
to cathode
G (collecting fraction)
Elevation above the cathode (cm)
0.0
0.2
0.4
0.6
0.8
0
2
4
6
8
10


r_0 = 3.0 cm
L_0 = 6.9 cm
R_0 = 3.3 cm
to HCS
to cathode
G (collecting fraction)
Elevation above the cathode (cm)
0.0
0.2
0.4
0.6
0.8
0
2
4
6
8
10

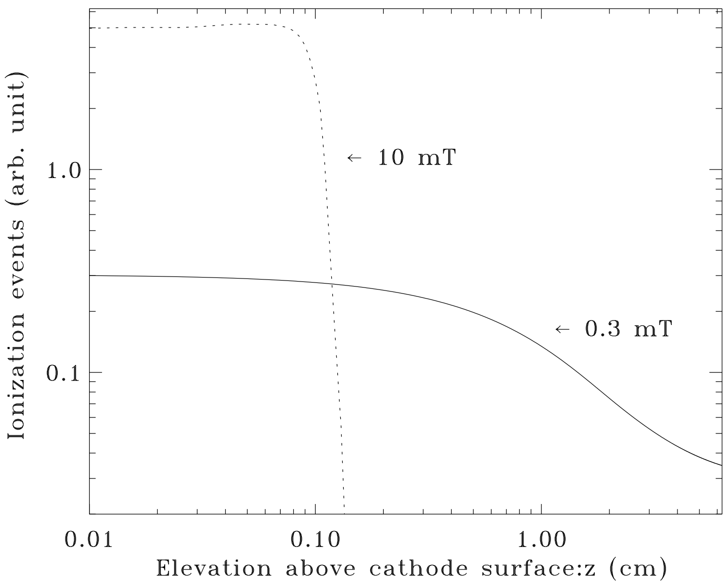


FIG. 15. ionization events as a function of ...