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function Lorentz, loc, options

common constants

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;;
;;  Compute the Lorentz force on an ion
;;
;; Assumes the dipole is aligned north-south
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qm = atomiccharge(options.atom)/atomicmass(options.atom)

r = sqrt(total(*loc.x^2, 2))
x = (*loc.x)[*,0]
y = (*loc.x)[*,1]
z = (*loc.x)[*,2]
;; Field strength in Gauss
Bx = 3*x*z*DipoleConsts.strength*r^(-5)
By = 3*y*z*DipoleConsts.strength*r^(-5)
Bz = (3*z^2-r^2)*DipoleConsts.strength*r^(-5)

;; Determine speed of ion relative to magnetic field
Bvx = -DipoleConsts.magrat * y
Bvy = DipoleConsts.magrat * x
vx = ((*loc.v)[*,0]-Bvx)/!const.c
vy = ((*loc.v)[*,1]-Bvy )/!const.c
vz = (*loc.v)[*,2]/!const.c

;; Electric field
Ex = 0. & Ey = 0. & Ez = 0.

ax = qm * (Ex + vy*Bz - vz*By)
ay = qm * (Ey + vz*Bx - vx*Bz)
az = qm * (Ez + vx*By - vy*Bx)

accel = dblarr(n_elements(x),3)
accel[*,0] = ax
accel[*,1] = ay
accel[*,2] = az

return, accel

end
```