

# Section 5: Collisions

AE435

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## 6 Ion-Atom Collisions

### Contents

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8

The interaction between a charge and an induced dipole scales as  $r^{-4}$ , so the cross-section is slightly wider than for atom-atom collisions. But similar to atom-atom collisions.

But the most important process for EP plasmas is **CHARGE REACTIVE** Charge-exchange

The cross-section size depends on how the ionization potentials match; generally,

Note that charge-exchange has profound implications for EP:

- Hollow cathodes: heavy particle interactions drive temperatures and emission currents
- Ion thrusters: screen grid lifetime diminished by intergrid CEX
- Hall thrusters: plumes, especially S/C interaction (erosion and redeposition)