Summary of Discussion on Review of Current Status of Ion-Atom Collision Data

(Tom Kirchner)
Preamble

Instead of reviewing the current status of ion-atom collision data the discussion focused on assembling and prioritizing a list of systems and quantities worthwhile studying in the context of the CRP

→ (partially) shared workplan?
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→ (partially) shared workplan?

1. Wishlist I: collision systems
2. Wishlist II: quantities of interest
3. Priorities
Wishlist I: collision systems

(A) $^1H(1s) + \left\{ \begin{array}{l} H^+ \\ He^{2+} \\ Be^{4+} \\ C^{6+} \\ H(1s) \\ H_2 \end{array} \right\} @ 10 \text{ keV} - 1 \text{ MeV}$

(B1) $H(2s, 2p_0, 2p_1) + \left\{ \begin{array}{l} H^+ \\ He^{2+} \\ Be^{4+} \\ C^{6+} \\ H(1s) \\ H_2 \end{array} \right\} @ 10 \text{ keV} - 1 \text{ MeV}$

(B2) $H(n > 2) + \text{??} @ 10 \text{ keV} - 1 \text{ MeV}$
Wishlist I: collision systems

\[ \text{He (1s}^2 \text{, } 1S) + \text{He (1s}2s^3S) + \text{bare ions (at/up to 70 keV total energy)} \]

\[ \text{Li (2s)} + \text{Na (3s)} + \text{bare ions (at/up to 50 keV total energy)} \]

(possibly stripped ions are of lower priority)

(check Schweinzer et al. papers)
Wishlist II: quantities of interest

- Excitation probabilities and cross sections \((m\text{-resolved})\)

- Density matrix elements \(<\hat{g}_1 D \hat{g}_1'>\)
  \((\hat{g}, \hat{g}' = 2s, 2p_0, 3s, 3p_0, 3d_0)\)

- Ionization probabilities and cross sections \(A, B, (C, D)\)

- Charge exchange probabilities and cross sections \(A, (B, C, D)\)

- \((n \ell)\) - resolved excitation probabilities and cross sections \((B) C, D\)
Priorities

(i) $H^+ - H (1s) : \text{target excitation}
   \quad (m \text{ resolved}; \ n=2,3)$

(ii) $H^+ - H (1s) : \text{ionization + charge exchange}$

(iii) $H^+ - H^*$

(iv) $A^{9+} - \left\{ H (1s) \ H^* \right\}$

... 

Objective: come up with evaluated and recommended data