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**Cross Sections for Electron-impact Excitation of Electronic States in Atoms and Molecules -
Application Examples of the BE*f*-scaling model in Optically-allowed Transitions**

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The differential cross section (DCS) and integral cross section (ICS) measurements of electron-impact electronic excitation for noble gases were reported by many groups. Unfortunately, despite all these endeavours, if we were to characterize the level of agreement between these studies, then we could only conclude that it remains “patchy” at best. Hence, we report measurements of DCS and ICS for electron-impact excitation of the lowest electronic states in noble gases (Ne, Ar, Kr and Xe), and compare with results from a scaled Born cross section (BE*f*-scaling). We have previously found for the He atom and a number of molecules, including H₂, O₂, CO, H₂O, CO₂, N₂O and C₆H₆ that the BE*f*-scaling approach, for calculating ICSs for dipole-allowed electronic-state transitions, can lead to a very accurate description of the various scattering processes from threshold to 2000 eV [1]. Exceptions to this general statement have only been found in those cases where resonance effects due to the temporary capture of the incident electron by the target and contamination from an accidentally degenerate or near-degenerate triplet state have arisen. Our results for noble gases will be presented in detail at the conference.

[1] H. Kato et al., NIFS Research Report, NIFS-DATA-108, 1 (2009).