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Proton collisions with water clusters studied with a screened independent atom model[1] TOM KIRCHNER, York University, HANS JÜRGEN LÜDDE, Goethe University Frankfurt — The independent atom model purports that electron emission from molecules can be calculated by combining atomic cross sections. The simplest realization of this idea is the additivity rule according to which the molecular cross section is obtained as the sum of the atomic cross sections for all atoms that make up the molecule. Recently, we introduced a model in which the simple sum is replaced by a weighted sum. The weight factors are determined from an exact calculation of the effective area that is obtained when surrounding all atoms in the molecule by spheres representative of the atomic cross sections and projecting the resulting structure on the plane that is perpendicular to the projectile beam. The calculation is carried out using a pixel counting method [1]. In this contribution, we use this approach to study proton collisions with water clusters $(H_2O)_n, n$=1...10. A recent theoretical work found that at 100 keV impact energy the electron transfer cross section $\sigma_n^{\rm cap}$ for n=1...6 is proportional to $n^{2/3}$ [2]. By contrast, we find $\sigma_n^{\rm cap} \propto n$ at 100 keV, while at 10 keV $\sigma_n^{\rm cap} \propto n^{2/3}$ is obtained. [1] H.J. Lüdde et al, Eur. Phys. J. D 70 82 (2016). [2] A.J. Privett et al, PLoS ONE 12(4): e0174456 (2017).

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