

## Do Positrons Measure Molecular Diameters?

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In introduction of Brown-motion paper, Albert Einstein wrote that classical thermodynamics could yield “exact dimensions of atoms” (eine exakte Bestimmung der wahren Atomgröße möglich). Now, Röntgen-ray diffraction, viscosity studies, Van der Waals gas-state yield molecular radii with high precision, unfortunately, all different: for Ar the viscosity yields 1.83Å and van der Waals 1.24 Å; for He one expects a lower radius but these are 1.09Å and 1.33Å, respectively.

Measurements of total cross sections for positron scattering on molecules in gas phase, date from 70-ties<sup>1</sup>. In the zero-energy limit cross sections rise and at a few eV range show the Ramsauer minimum<sup>1</sup> but wide and flat. New measurements<sup>2</sup> with good statistics show that up to the positronium formation threshold cross sections are *constant*, like for hard-sphere scattering. The radii obtained<sup>1,2</sup> are 0.34Å for He, 0.52Å(!) for H<sub>2</sub>, 1.0Å for Ar, 1.6Å for CO<sub>2</sub>, 1.9Å for SF<sub>6</sub>. Inner atomic potential is repulsive for positrons: do they measure atomic cores?

<sup>1</sup>W.E.Kauppila et al., Phys.Rev. Lett. 36 (1976) 580

<sup>2</sup>G.Karwasz et al., Acta Phys. Pol., in print