

# Quantum Theory of the Monatomic Ideal Gas - Part I

A. Einstein<sup>a</sup> and S. N. Bose<sup>b</sup>

<sup>a</sup>Prussian Academy of Sciences, University of Berlin, Germany

<sup>b</sup>Department of Physics, Dhaka University, Dhaka, Bangladesh

I present the results of what will become two seminal papers on the theory of identical particles in quantum mechanics. I show that the derivation of Planck's law of black-body radiation from a modification of coarse-grained counting of phase space by S. N. Bose is equivalent to assuming that photons are rigorously identical.<sup>1</sup> I also extend Bose's formalism to material particles "bosons" and predict that these bosons will condense to a new quantum state at sufficiently low temperatures. Hopefully this report will motivate experimental searches for this new state of matter.

1. Einstein, A. (1925). "Quantentheorie des einatomigen idealen Gases". Sitzungsberichte der Preussischen Akademie der Wissenschaften.

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