

# Particles, Objects, and Physics

Pniower, Justin (2005) Particles, Objects, and Physics.

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## Abstract

This thesis analyses the ontological nature of quantum particles. In it I argue that quantum particles, despite their indistinguishability, are objects in much the same way as classical particles. This similarity provides an important point of continuity between classical and quantum physics. I consider two notions of indistinguishability, that of indiscernibility and permutation symmetry. I argue that neither sort of indistinguishability undermines the identity of quantum particles. I further argue that, when we understand indistinguishability in terms of permutation symmetry, classical particles are just as indistinguishable as quantum particles; for classical physics also possesses permutation symmetry.

**Keywords:** indistinguishability, indiscernibility, permutation symmetry, anti-haecceitism, quantum particles, particle identity, quantum statistics, classical statistics, ontic vagueness

**Subjects:** [Specific Sciences: Physics: Statistical Mechanics/Thermodynamics](#)  
[Specific Sciences: Physics: Quantum Mechanics](#)

**ID Code:** 3135

**Deposited By:** [Pniower, Justin](#)

**Deposited On:** 19 January 2007

**Additional Information:** DPhil thesis submitted Trinity Term 2005 at the University of Oxford.