# Discerning Elementary Particles

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## Abstract

We extend the quantum-mechanical results of Muller & Saunders (2008) establishing the weak discernibility of an arbitrary number of similar fermions in finite-dimensional Hilbert-spaces in two ways: (a) from fermions to bosons for all finite-dimensional Hilbert-spaces; and (b) from finite-dimensional to infinite-dimensional Hilbert-spaces for all elementary particles. In both cases this is performed using operators whose physical significance is beyond doubt.This confutes the currently dominant view that (A) the quantum-mechanical description of similar particles conflicts with Leibniz's Principle of the Identity of Indiscernibles (PII); and that (B) the only way to save PII is by adopting some pre-Kantian metaphysical notion such as Scotusian haecceittas or Adamsian primitive thisness. We take sides with Muller & Saunders (2008) against this currently dominant view, which has been expounded and defended by, among others, Schr\"odinger, Margenau, Cortes, Dalla Chiara, Di Francia, Redhead, French, Teller, Butterfield, Mittelstaedt, Giuntini, Castellani, Krause and Huggett.

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