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## **Cultures of Modelling: Rudolf Peierls on ‘Model-Making in Physics’**

**ABSTRACT.** The philosophical debate about scientific models has, over the past thirty years or so, reached a high degree of sophistication. Yet, in spite of efforts to seek common ground with scientific practice, there remains the suspicion that philosophical accounts are sometimes too ‘free-floating’, in that they do not adequately reflect scientists’ views (and actual uses) of models. The present paper deals with one such scientific perspective, due to physicist Sir Rudolf Peierls (1907-1995). Writing thoroughly from the perspective of a theoretician with a deep appreciation for experimental physics, Peierls, in a series of papers, developed a taxonomy of scientific models, which – in spite of some inevitable arbitrariness – exhibits surprising points of convergence with contemporary philosophical accounts of how scientific models function. The present paper situates Peierls’s approach within the philosophical and scientific developments of his time, engages (in an immersive way) with his proposed taxonomy, and argues that Peierls’s views – and others like them – warrant the recent philosophical shift from a focus on model-based representation to non-representational (e.g., exploratory) uses and functions of models.

**KEYWORDS:** scientific models, modeling, scientific representation, exploration.

### **1. Introduction**

Scientific models and the activity of modelling in science have, in recent years, attracted considerable attention from philosophers of science. Sophisticated philosophical accounts have been proposed regarding how models represent their targets and allow us to infer knowledge about them, and a plethora of case studies from the various special sciences have been worked out, many