

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Beyond quantum-classical analogies: high time for agreement?**

MICHELE MARROCCO, ENEA — Lately, many quantum-classical analogies have been investigated and published in many acknowledged journals. Such a surge of research on conceptual connections between quantum and classical physics forces us to ask whether the correspondence between the quantum and classical interpretation of the reality is deeper than the correspondence principle stated by Bohr. Here, after a short introduction to quantum-classical analogies from the recent literature, we try to examine the question from the perspective of a possible agreement between quantum and classical laws. A paradigmatic example is given in the striking equivalence between the classical Mie theory of electromagnetic scattering from spherical scatterers and the corresponding quantum-mechanical wave scattering analyzed in terms of partial waves. The key features that make the correspondence possible are examined and finally employed to deal with the fundamental blackbody problem that marks the initial separation between classical and quantum physics. The procedure allows us to recover the blackbody spectrum in classical terms and the proof is rich in consequences. Among them, the strong analogy between the quantum vacuum and its classical counterpart.

Michele Marrocco  
ENEA

Date submitted: 05 Nov 2015

Electronic form version 1.4