

Objects, structures and physics

Elena Castellani

With the flourishing of structural realism, both in its epistemic and ontic form, the role of structure has become a central topic in current debates on scientific theories and scientific representation. Structural approaches are not novel in the philosophy of science. In particular, the fundamental role acquired in contemporary physics by symmetry principles and their exploitation through group theory techniques has motivated a group-theoretic approach to the question of characterising objectivity and physical objects, mainly inspired by the work and reflections of such figures as Hermann Weyl and Eugene Wigner, which has already a long story. In more recent times, ontic structural realism – the position maintaining that “all that there is, is structure” – has taken the further step of identifying (more or less directly) as real the symmetry group structures that are at the core of fundamental physics. In this talk I will discuss the legitimacy of this step and, more generally, the role that can be attributed to such structural tools as symmetry groups, which are used at the level of scientific practice, when addressing the issue of scientific representation.