1034-00-14 **Matthew J. Visser***, Victoria University of Wellington. *Emergent spacetimes, rainbow geometries, and pseudo-Finsler geometries.*

The theoretical physics community is increasingly pushing at the boundaries of classical differential geometry (Riemannian and Lorentzian manifolds), and seeking new mathematical tools to investigate various extensions of Einstein gravity. Among the as yet mathematically imprecise concepts being mooted are the notions of emergent spacetime (where the manifold picture breaks down at short distances), rainbow geometies (where the "metric" somehow depends on energy and momentum), and particular unexplored sub-classes of pseudo-Finsler geometry. I will outline why these ideas are considered interesting, and indicate some of the foundational mathematical issues that remain open. (Received December 06, 2006)