Metallic phase of the quantum Hall effect in four-dimensional space[1] JONATHAN EDGE, Leiden University, JAKUB TWORZYDLO, University of Warsaw, CARLO BEENAKKER, Leiden University — We study the phase diagram of the quantum Hall effect in four-dimensional (4D) space. Unlike in 2D, in 4D there exists a metallic as well as an insulating phase, depending on the disorder strength. The critical exponent $\nu \approx 1.2$ of the diverging localization length at the quantum Hall insulator-to-metal transition differs from the semiclassical value $\nu = 1$ of 4D Anderson transitions in the presence of time-reversal symmetry. Our numerical analysis is based on a mapping of the 4D Hamiltonian onto a 1D dynamical system, providing a route towards the experimental realization of the 4D quantum Hall effect.

Jonathan Edge
Leiden University