

## MP 2 Hauptvorträge II

Zeit: Dienstag 16:30–18:20

Raum: TU MA043

**Hauptvortrag**

MP 2.1 Di 16:30 TU MA043

**Isometric embeddings and scaling laws in compressed elastic sheets** — ●SERGIO CONTI — Fachbereich Mathematik, Universität Duisburg-Essen, Lotharstr. 65, 47057 Duisburg

Crumpling a sheet of paper leads to the formation of complex folding patterns over several length scales. This can be understood on the basis of the interplay of a nonconvex elastic energy, which penalizes local stretching, and a small singular perturbation, which penalizes high curvature. We obtain, using a combination of explicit constructions and general results from differential geometry, an upper bound for the energy of a compressed thin sheet which scales as the thickness to the 5/3. Focussing on a simplified geometry we then prove optimality of this energy scaling.

**Hauptvortrag**

MP 2.2 Di 17:25 TU MA043

**Symmetry classes of disordered fermions (the 10-fold way)** — ●MARTIN ZIRNBAUER — Institut für Theoretische Physik, Universität Köln, Zùlpicher Str.77, 50937 Köln

Building upon Dyson's fundamental 1962 article known in random matrix theory as 'the threefold way' we classify disordered fermion systems with quadratic Hamiltonians by their unitary and antiunitary symmetries. Important examples are afforded by noninteracting quasiparticles in disordered metals and superconductors, and by relativistic fermions in random gauge field backgrounds. The primary data of the classification are a Nambu space of fermionic field operators which carry a representation of some symmetry group. Eliminating the unitary symmetries by transferring to an irreducible block of equivariant homomorphisms, we show that each set of irreducible block data determines an irreducible classical compact symmetric space. Conversely, every irreducible classical compact symmetric space occurs in this way. This proves the correspondence between symmetry classes and symmetric spaces conjectured some time ago.