Conformal field theory of critical Casimir forces THORSTEN EMIG, Massachusetts Institute of Technology, UMI Multi-Scale Materials Science for Energy and Environment, Physics Department, GIUSEPPE BIMONTE, Dipartimento di Scienze Fisiche, Universita di Napoli Federico II, Complesso Universitario MSA, Via Cintia, I-80126 Napoli, Italy, MEHRAN KARDAR, Massachusetts Institute of Technology, Physics Department, 77 Massachusetts Avenue Cambridge, MA 02139 — Thermal fluctuations of a critical system induce long-ranged Casimir forces between objects that couple to the underlying field. For two dimensional conformal field theories (CFT) we derive exact results for the Casimir interaction for a deformed strip and for two compact objects of arbitrary shape in terms of the free energy of a standard region (circular ring or flat strip) whose dimension is determined by the mutual capacitance of two conductors with the objects' shape; and a purely geometric energy that is proportional to conformal charge of the CFT, but otherwise super-universal in that it depends only on the shapes and is independent of boundary conditions and other details. The effect of inhomogenous boundary conditions is also discussed.

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