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Many-body Contributions to Green's Functions and Casimir Energies[1] MARTIN SCHADEN, KULOTH V. SHAJESH, Rutgers University — We use a multiple scattering formalism to extract finite N- body parts of Green's functions and Casimir energies that describe the interaction of N objects that do not have a common intersection [arXiv:1011.2475]. For local interactions the N-body scattering matrix is expressed in terms of single- body transition matrices. The N-body Casimir energy is given by the trace of the N-body piece of the corresponding Green's function. This formally requires solution of a set of linear integral equation. The three-body piece of the Casimir energy of a massless scalar field interacting with potentials is derived and we explicitly evaluate it for three parallel semi-transparent plates and for weakly interacting wedges placed on Dirichlet plates. In all these cases the three-body contribution to the vacuum energy is positive. We observe that the three-body Casimir energy for a triangular-wedge enclosing a given area with the Dirichlet plate is minimal when the shorter side of the wedge is perpendicular to the plate.

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