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Vacuum densities for branes orthogonal to AdS boundary

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Vacuum expectation value for the energy-momentum tensor of a massive scalar field is investigated in the geometry of two parallel branes perpendicular to the AdS boundary. On the branes the field operator obeys Robin boundary conditions. Depending on the coefficients in those conditions and on the separation between the branes, the vacuum energy density can be either positive or negative. In addition to the diagonal components, the vacuum energy-momentum tensor has a nonzero off-diagonal stress. The Casimir forces acting on the branes are decomposed into components perpendicular and parallel to the branes. Unlike to the problem of parallel plates in the Minkowski bulk, the normal Casimir forces acting on separate branes differ if the boundary conditions on the branes are different. Those forces can be either repulsive or attractive. Depending on the coefficients in the boundary conditions, the parallel component of the force (shear force) is directed toward or from the AdS boundary. Both the forces may change the sign as functions of the distance between the branes. At large distances they show a power-law decay as functions of the proper distance.

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