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Achim Kempf* (akempf@uwaterloo.ca), Dept. of Applied Mathematics, 200 University Avenue West, Waterloo, Ontario N2L 3G1, Canada, and **Robert Martin** (rtwmartin@math.uwaterloo.ca), Dept. of Applied Mathematics, 200 University Avenue West, Waterloo, Ontario N2L 3G1, Canada. *A method for covariant discretization of space-time using Shannon sampling theory.*

For pseudo-Riemannian manifolds, we consider subspaces of square integrable functions which respect a fixed spectral cutoff on the D'Alembertian. These function spaces generalize the space of bandlimited functions on the real line to spaces of bandlimited functions on curved spacetime. We show that, generalizing Shannon's sampling theory, these function spaces can possess a finite density of degrees of freedom on one and two dimensional hypersurfaces. This implies that any function belonging to such a function space can be reconstructed perfectly at all points from its sample values taken on any discrete sets of points, if those points are of sufficient average density on these hypersurfaces. Within the considered function spaces this provides a covariant discretization of the hypersurfaces which is not an approximation. Recent results for FRW spacetimes are discussed in detail. (Received September 26, 2006)