Contribution ID: **651** Type: **Talk in a parallel session**

Quantization without $3+1$ decomposition in curved spacetime and its Schroedinger picture limit

Monday, 8 July 2024 18:20 (10 minutes)

We present an approach to field quantization in curved spacetime which is based on the De Donder-Weyl Hamiltonian theory where space and time dimensions are treated on an equal footing. This leads to a description in terms of Clifford algebra valued wave functions on the bundle of field variables an spacetime variables, and a Dirac-like analog of the Schroedinger equation for this universal wave function. The procedure of quantization (of Poisson-Gerstenhaber brackets of differentail forms) requires introduction of an ultraviolet parameter
$varkappa$ on purely dimensional grounds. We analyze a relation of this approach to the standard QFT in curved spacetime and demonstrate that the Schr\"odinger functional representation of the latter is reproduced, after $3+1$ decomposition, in the limit of infinitesimal $1/$
$varkappa$. In this limit, the Schroedinger wave functional appears as a product integral of precanonical wave functions, both in static and non-static spacetimes.

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Session Classification: Quantum field theory in curved spacetimes and perturbative quantum gravity