This is one of the series of papers on application of the so-called general boundary formulation of quantum theory [1] proposed by Oeckl, one of the authors of this paper. In the general boundary formulation Oeckl and others claim that one can obtain a modified or alternative quantum theory by considering seriously the boundary of spacetime region defined in the theory; the boundary may be space-like (time slice) or time-like (spatial boundary).

In the standard canonical quantization the contribution from spatial boundaries are neglected since there is no variation of fields at spatial infinity. Of course, the canonical quantization does not take account of curved spacetime but still it is not very clear, at least for the reviewer, how the general boundary formulation gives rise to a new quantum theory simply by introducing a notion of boundary state space.

This point, the incompatibility of the general boundary formulation and the canonical quantization, is in fact intensively studied in [2]. And it is suggested that the general boundary formulation may be understood more naturally with the concept of holomorphic (or geometric) quantization. Complex structures are thus expected to be incorporated into this formulation. This paper studies how this can be realized in the computation of an S-matrix for Klein-Gordon theory on anti-de Sitter space. The main idea is presented in section 2; see also a short note [3]. The rest of the paper deals with technical details and analyses for properties of these complex structures.

References

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[3] D. Colosi, M. Dohse and R. Oeckl, J. Phys. Conf. Ser. **360**, 012012 (2012) [arXiv:1112.2225 [hep-th]].