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# Framed DDF Operators and Minimally Off-shell Solutions of Virasoro Constraints in Bosonic String Theory

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DDF operators/states was a formalism first developed by Di Vecchia, Del Giudice and Fubini around 1972. It gives an explicit construction of BRST invariant, not exact (bosonic) string states which I shall briefly recap in the introduction. It is very useful for studying massive string spectra and their scattering amplitudes. After the introduction, the talk will focus on generalising the standard formulation in terms of Local Frames (Framed DDF). I shall explain how this allows us to completely decouple the FDDF operators from the associated tachyon vertex (thereby allowing us to go minimally off-shell) and also comment on its advantages over the standard DDF formulation. We then look at the solutions of the Virasoro constraints for the first two levels explicitly and show that the general solution is not in the usual (TT) gauge. Finally, if time permits we shall look at some recent interesting results of chaotic scattering amplitudes involving DDF states and its possible dependence on the 'spin content' of the states.

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