Panel on corner degrees of freedom And celestial holography

Marc Geiller—Wolfgang Wieland—Daniele Pranzetti

▸ From small to big: corner symmetry and kinematics—>
Causal diamonds and dynamics —> Asymptotic infinity

▸ Adressing several fundamental issues of spin-foams and loop gravity:

▸ A framework were quantum geometry carries a representation of the diffeomorphism symmetry group and the Lorentz symmetry group compatible with subsystem decomposition

▸ A framework were fundamental results such as the role of the Immirzi parameter and the quantization of area can be understood in the continuum and the usual language of effective field theory

▸ A framework were non-perturbative quantum gravity results connects seamelessly to the S-matrix approach of quantum gravity: From corner to asymptotic symmetry and celestial holography.

Summary

‣ From Marc: Imposing constraints on states means that the spin networks carries, when cut in half, <u>representations of the corner symmetry</u> group: not only local SU(2) but local diffeo and more.

‣ From Wolfgang: Dynamics along null surface can be recast as <u>charge evolution</u> and radiation encoded into charge non-conservation.

‣ From Daniele: The S-matrix satisfies infinite set of <u>Ward identities</u> derived from the symmetry. We are looking forward to similar conditions for the spin foam amplitude

Ciambelli, Chen, Donnelly, <u>Geiller</u>, Girelli, Jai-Akson, Livine, Leigh, Moosavian, Margalef, Perez, <u>Pranzetti</u>, Riello, Seraj, Speziale, Speranza, Shoshany, Zwikel, <u>Wieland</u>