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Some directions for the future of primordial non-Gaussianities

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The field of primordial non-Gaussianities is twenty years old. During that time, cosmologists have built a dictionary between the physics active during inflation and higher-order correlation functions of primordial density fluctuations. I will argue that this dictionary is far from complete, with theoretical predictions available only in restricted classes of theories.

To fill in this gap, I will present the cosmological flow, a complete and systematic approach to compute inflationary correlators for all inflationary theories. This enables to assist our theoretical understanding and to generate theoretical data for an unbiased interpretation of upcoming cosmological observations.

I will show that the cosmological collider signal, lying in soft limits of correlators, often described as a robust probe of the field content of inflation, is as robust as its assumptions are restrictive, and I will show its properties in theories involving multiple degrees of freedom, with strong mixing, in the presence of features.

Eventually, I will explain that if equilateral non-Gaussianities are detected, there exists a natural next observational target, the low-speed collider signal, manifesting as a peculiar resonance in mildly-soft kinematical configurations.

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