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Non-Projective Bounds in Gravity and Negativity

We develop a primal bootstrap framework for gravitational effective field theories based on fully crossing-symmetric dispersion relations, using finite-resolution sampling instead of smearing. This approach has several key advantages: it allows direct control over the number of subtractions, makes it possible to impose linearized unitarity beyond positivity, and gives direct access to extremal spectra. We uncover new non-projective bounds that fix the overall scale of EFT couplings, including upper bounds of the form
M
MPlanck ⪅ 7.8 in D = 5, implying that the EFT cutoff M cannot be arbitrarily larger than the Planck scale. At extremal points saturating these bounds, we find stable spectra with sharp and unexpected quadratic trajectories.

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