DESY THEORY WORKSHOP
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**Particle Cosmology
after Planck**

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Integrability in planar N=2 gauge theories

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Any N=2 gauge theory in four dimensions contains a set of local operators made only out of fields in the N=2 vector multiplet that is closed under renormalization to all loops, namely the SU(2,1|2) sector. We present a diagrammatic argument that for any planar N=2 theory the SU(2,1|2) Hamiltonian acting on infinite spin chains is identical to all loops to that of N=4 SYM, up to a redefinition of the coupling constant $g^2 \rightarrow f(g^2)$. Thus, this sector is integrable and anomalous dimensions can be read off from the N=4 ones up to this redefinition. For each N=2 theory the universal function f(g) can be obtained by computing the circular Wilson loop using localization and comparing it to the N = 4 one.

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