How to sweep cosmic dust under a subspace carpet, optimally.

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Résumé

Look up at the microwave radiation from the sky and you will be blinded by a strong emission, literally coming from the beginning of time. This relic light, known as the 'Cosmic Microwave Background' (CMB), is of immense interest to cosmology because the (tiny) variations of its intensity across the celestial sphere provide us with an instant photograph od our Universe in its infancy.
Unfortunately, observations of the cosmic background are partially obscured by several foreground emissions, the strongest being cosmic dust. Still, disentangling the CMB from other emissions is possible by combining maps of the sky at several wavelengths. This is a component separation problem and this talk sketches how it has been tackled in ESA's Planck mission. Simplifying, the trick was to determine a subspace of the data space which would contain as much foreground emission as possible and to ptoject that out of the data.

However, lacking accurate statistical models of the various foreground emissions, optimal determination of the 'foreground subspace' is impossible (so, sorry for the boastful title). Nonetheless, simple reasoning shows that spectral statistics can bring us very close to optimality. That argument will be main focus of the talk.

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