Optimal Spectral Gaps

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I'll discuss spectral gaps in the following contexts:
- d-regular graphs
- locally symmetric spaces e.g. hyperbolic manifolds
- finite dimensional unitary representations of discrete groups e.g. free groups, surface groups.

 Of particular interest are spectral gaps that are in some a priori sense optimal or almost optimal. The discussion will center on recent developments giving new examples of (almost) optimal spectral gaps