Bilayer antiferromagnet with four-spin interaction\textsuperscript{1} THOMAS C. LANG, Boston University, TU Graz, Austria, ANDERS W. SANDVIK, Boston University — We investigate a spin-1/2 Heisenberg antiferromagnet with four-spin interaction on bilayer square and honeycomb lattices. In addition to the standard Neel and quantum disordered phases, these models can be expected to have a valence-bond-solid (VBS) phase \cite{1}. Our aim is to locate the VBS phase and to investigate, in particular, a transition from quantum disorder to VBS. This is potentially a deconfined quantum critical point \cite{1}. We use a recently introduced ground state projection Monte Carlo method which allows us to study these models without negative-sign problems \cite{2}.

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