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**Decoherence-free subspaces and incoherently generated coherences** RAISA KARASIK, BQIC and Applied Science & Technology, University of California, Berkeley , KARL-PETER MARZLIN, BARRY C. SANDERS, IQIS, University of Calgary, K. BIRGITTA WHALEY, BQIC and Dept. of Chemistry, University of California, Berkeley — A decoherence-free subspace (DFS) is a collection of states that is immune to the dominant noise effects created by the environment. DFS is usually studied for states involving two or more particles and is considered a prominent candidate for quantum memory and quantum information processing. We present rigorous criteria for the existence of DFS in finite-dimensional systems coupled to the Markovian reservoirs. This allows us to identify a new special class of decoherence free states that relies on rather counterintuitive phenomenon, which we call an “incoherent generation of coherences.” We provide examples of physical systems that support such states.

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