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**The ubit model in real-amplitude quantum theory**

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The logical structure of quantum theory is unchanged if we replace the usual complex probability amplitudes with real amplitudes, but the physics is in general quite different. Here we consider a specific model within real-amplitude quantum theory in which a hypothetical binary quantum system, the ubit, substitutes for the complex phase factors of the standard theory. In a certain limit, this model yields an effective theory that looks very much like ordinary quantum theory, but it differs in that it exhibits spontaneous decoherence of isolated systems.