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Scratching the surface of ice: Interfacial phase transitions and their kinetic implications.

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The surface structure of ice maintains a high degree of disorder down to surprisingly low temperatures. This is due to a number of underlying interfacial phase transitions that are associated with incremental changes in broken symmetry relative to the bulk crystal. In this talk I summarize recent work attempting to establish the nature and locations of these different phase transitions as well as how they depend on external conditions and nonequilibrium driving. The implications of this surface disorder is discussed in the context of simple kinetic processes that occur at these interfaces. Recent experimental work on the roughening transition is highlighted.