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**Designing icephobic surfaces by passively sustaining liquid film at ice-substrate interface** TOM ZHAO, PAUL JONES, NEELESH PATANKAR, Northwestern University — Ice formation poses a significant barrier to transportation, energy generation and transport, gas extraction, etc. We propose to design icephobic surfaces that reduce ice formation and lower ice adhesion by sustaining a film of liquid water at the interface between bulk ice and the substrate. The liquid layer is in phase equilibrium with the surrounding bulk ice, and thus exists without constant energy input. Using molecular dynamic simulations, we show this liquid film can be maintained indefinitely by exploiting the phenomena of interfacial premelting and the freezing point depression of ice confined in surface texture due to the Gibbs Thomson effect. We demonstrate the reduction of both the work and strength of ice adhesion as a function of surface wettability and geometric parameters of the surface texture.

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