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A New Contact Line Structure for Surfactant-Driven Superspreading Phenomenon HSIEN-HUNG WEI, National Cheng Kung University — We propose a new contact line structure capable of explaining the curious linear spreading law observed in surfactant-driven superspreading. We show that a tiny surfactant leak from the air-liquid interface to the substrate suffices to promote the motion of the contact line. This leak leads to a microscopic surfactant-depletion zone on the interface in the vicinity of the contact line. Together with pressure buildup by the Marangoni shearing, a distinctive capillary nose is then developed over the zone to drive the contact line in a surfactant-free manner at a constant wetting speed, which explains the linear superspreading law. Our study not only captures many features seen in previous experiments and simulations, but also provides renewed insights into the superspreading phenomenon.

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