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Stochastic binding of Staphylococcus aureus to hydrophobic surfaces

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Complete List of Authors:	Thewes, Nicolas; Saarland University, Experimental Physics Jacobs, Karin; University of Saarland, Department of Experimental Physics Thewes, Alexander; Saarland University, Theoretical Physics Loskill, Peter; Saarland University, Experimental Physics; University of California at Berkeley, Department of Bioengineering and California Institute of Quantitative Biosciences (QB3) Peisker, Henrik; Saarland University, Institute of Medical Microbiology and Hygiene Bischoff, Markus; Saarland University, Institute of Medical Microbiology and Hygiene Herrmann, Mathias; Saarland University, Institute of Medical Microbiology and Hygiene Santen, Ludger; Saarland University, Theoretical Physics

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Via a combined experimental and computational approach, the initiation of contact in the adhesion process of the pathogenic bacterium Staphylococcus aureus is studied. By AFM force spectroscopy with single cell bacterial probes paired with Monte Carlo simulations contact formation is investigated. Our results reveal that bacteria attach to a surface over distances far beyond the range of classical surface forces via stochastic binding of thermally fluctuating cell wall proteins.