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**Hydrodynamic fundamentals of slippage over a superhydrophobic surface** CLARISSA SCHÖNECKER, DAVID SCHÄFFEL, KALOIAN KOYNOV, DORIS VOLLMER, HANS-JÜRGEN BUTT, Max-Planck-Institute for Polymer Research — Water easily slips over superhydrophobic surfaces, making such surfaces attractive for the development of functional coatings. While the global behavior of flow past superhydrophobic surfaces has been widely investigated, the local physical fundamentals leading to slippage still remain unclear. Using fluorescence correlation spectroscopy, we performed detailed measurements of the local slip length for water in the Cassie state on a structured superhydrophobic surface. In combination with numerical calculations of the flow, we revealed that the local slip length of a superhydrophobic surface is finite, non-constant and anisotropic. Furthermore, it can be strongly influenced by the presence of surface active substances. All these properties can be explained by the local hydrodynamics within the air layer and at the air-water interface, such as the local flow field depending on the surface geometry or Marangoni forces. More general, these findings are also of relevance for the development of theoretical models of slippery surfaces that rely on a fluid being in the Cassie state.

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