Super-resolution imaging reveals a length dependent dynamics of MreB filaments in B. Subtilis

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We combine an objective launched total internal reflection fluorescence (TIRF) set-up with structured illumination \cite{1}. This brings together the advantages of high contrast and superior resolution. The evanescent sinusoidal light grid is created with the help of a spatial light modulator (SLM) \cite{2}. In combination with a fast camera for image acquisition this enables high frame rates of up to 1 Hz, sufficient to image many dynamic processes in living cells.

We show that the combination of TIRF-microscopy with structured illumination yields images of high contrast with super-resolution of biological samples. We imaged the dynamics of the cytoskeletal element MreB in living B.Subitlis bacteria on the timescales of seconds with about 100nm resolution. Finer structures can be discriminated, which are relevant for the biological understanding of the role of MreB filaments regarding cell wall stability and organization \cite{3}. Our images proof the outstanding capabilities of TIRF-SIM for live cell imaging (Figure 1).

![Figure 1](image)

\textbf{Figure 1:} (left) Usual TIRF-image of MreB in 	extit{bacillus subtilis}. (right) Reconstructed TIRF-SIM image with superresolution. Much finer details are visible.


\cite{3} P.v. Olshausen\textsuperscript{1,2}, H. J. D. Soufo, P. Graumann, A. Rohrbach, „ Super-resolution imaging of dynamic MreB filaments in B. Subtilis reveals a length dependent transport velocity”, submitted