

Abstract Submitted
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Dynamic Dimensional Analysis of *In-Vivo* Microorganisms Using Polarized Light Scattering WILLEM VAN DE MERWE, Indiana Wesleyan University, JOZSEF CZEGE, USUHS — We have successfully determined average lengths and diameters of randomly-oriented rod-shaped bacteria in-vivo by evaluating the Mueller matrix ratio $\langle S_{34} \rangle / \langle S_{11} \rangle$ together with Coulter counter measurements of cell volumes (references 1 and 2.) We showed that our technique allows one to follow real-time dimensional changes taking place at a rate of about 14 nm/min. We expect to extend this method to synchronized cultures and will attempt to measure changes in the ratio for partially aligned bacterial cells. We will give a rationale for our expectation that this will provide additional information for example about growth characteristics of the bacteria. We used the coupled dipole model to compare theoretical predictions and experimental observations. Specifically, by refining our dimensional analysis we expect soon to be able to study the dynamic of bacterial cell division real-time as well as obtain additional identifying signatures of importance to medicine, biotechnology and detection. 1) Applied Optics **43** (2004) 5295-5302 2) Biophysical J. **69** (1995) 1170-1177

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