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Resolution of distributions of translational diffusion constants by fluctuation correlation spectroscopy

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### Authors

Gratton, E  
Barcellona, M  
Muller, J  
[et al.](#)

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Enrico Gratton, Maria Luisa Barcellona, Joachim D Müller, and Yan Chen.

**Resolution of distributions of translational diffusion constants by fluctuation correlation spectroscopy.**

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**Abstract**

Fluctuation correlation spectroscopy may provide information about the translational diffusion of macromolecules in solution. The analysis of the intensity fluctuations using the autocorrelation function gives a parameter that can be related to the translational diffusion constant. In several experimental situations, macromolecular aggregates produce a distribution of molecular weights and correspondingly, a distribution of translational diffusion constants. We have explored several methods, which recover the distribution using a fitting procedure with prearranged shape for the molecular weight distribution. We present experimental results obtained with DNA polymers that have the capability to form relatively large molecular aggregates. We discuss the sensitivity of the methods and the limits of resolvability of molecular weight distributions.