

Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

A wavelet based time-frequency analysis of wave packet fractional revivals¹ SURANJANA GHOSH, S.R.F, JAGANNATH BANERJI, Associate Professor — We show that the time-frequency analysis of the autocorrelation function based on its wavelet transform [1], is a better tool to resolve fractional revivals [2] of a wave packet than the usual time domain analysis. We study the above for two different systems like a Rydberg atom [3] and a diatomic molecular system [4] and show that the present method can resolve fractional revivals of higher order than what can be achieved by the time domain analysis. This advantage is crucial in reconstructing the initial state of the wave packet when its coherent structure is short-lived and decays before it is fully revived. References: [1] R. M. Rao and A. S. Bopardikar, *Wavelet Transforms: Introduction to Theory and Applications* (ADDISON-WESLEY, 2000). [2] I. Sh. Averbukh and N. F. Perelman, Phys. Lett. A 139, 449 (1989); R. W. Robinett, Phys. Rep. 392, 1 (2004) and references therein; J. Banerji and S. Ghosh, J. Phys. B 39, 1113 (2006). [3] Z. D. Gaeta and C. R. Stroud, Jr., Phys. Rev. A 42, 6308 (1990). [4] S. Ghosh, A. Chiruvelli, J. Banerji and P. K. Panigrahi, Phys. Rev. A 70, 053813 (2006).

¹Physical Research Laboratory, Ahmedabad, India

Suranjana Ghosh
S.R.F

Date submitted: 02 Feb 2007

Electronic form version 1.4