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Slowing of Dynamics of Hydration Water Depends on Length Scale of Measurement JONATHAN NICKELS, Oak Ridge National Laboratory, JOHN ATKINSON, University of Guelph, SOULEYMANE DIALLO, STEFANIA PERTICAROLI, JOHN KATSARAS, Oak Ridge National Laboratory, JOHN DUTCHER, University of Guelph — The dynamics of hydration water associated with biomolecules is often slower than in bulk. We have used quasielastic neutron scattering (QENS) to study the dynamics of hydration water associated with soft colloidal, monodisperse phytoglycogen nanoparticles. The large water content of the phytoglycogen nanoparticles makes this an ideal system for investigations of hydration water in hydrophilic environments. We find that the hydration water translation is sub-diffusive, occurring, on average, ~ 5.8 times slower than that of bulk water. Significantly, these data demonstrate a clear q-dependence in the measured retardation factor, implying a corresponding length scale dependence. This observation may help to reconcile the often-conflicting range of hydration water retardation factors reported in the literature using different experimental techniques.

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