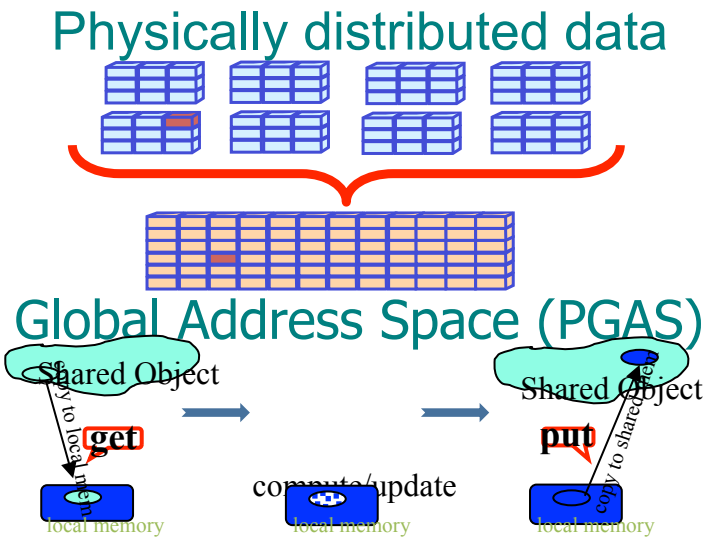
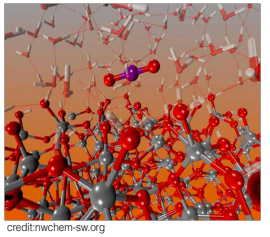
Dynamic Analysis for Program Verification and Optimization



- **Scalable data race detector for PGAS languages**
  - 50% overhead at 8K cores , 200X faster than commercial tools
- **Eliminating redundant synchronization**
  - NWChem -> 14% speedup at 2K cores
- **Exploiting performance variability for energy optimizations in dynamic apps**
  - NWChem – 20% energy savings at 2K cores
- **Dynamic program analysis for communication optimizations**
  - HPGMG - 65% less time spent in communication
- **Floating point reproducibility**
  - ReproBLAS - 1.2x to 3.2x slowdown vs. fastest non-reproducible code
- **Floating point precision tuning**
  - lowered precision in Gnu Scientific Library, up 40% speedup



HPGMG