

Physics

Easy and Efficient: How using simpler processes makes physics up to ten thousand times faster.

A new method of calculation makes atomic properties thousands of times faster to calculate.

Atoms—microscopic particles that everything in the universe is composed of—apply forces on each other. In the past, complex equations were needed to calculate the strength of these forces. A group of researchers including physicist Dean Lee at Michigan State University in East Lansing, Michigan, have developed a faster, albeit less precise, method for calculating these forces called eigenvector continuation (EC).

The numbers received via EC are not quite the same as numbers calculated by more intricate methods. However, the values are close enough to still be accurate for predicting atom behavior.

How much faster is EC? Lee speculates that atomic force calculations could be completed thousands of times faster. This would make it viable to calculate forces between many atoms, which is currently too computationally intensive to be realistic.

Ekstrom, A., Hebeler, K., Konig, S., Lee, D., Schwenk, A. “Eigenvector Continuation as an efficient and accurate emulator for uncertainty quantification”. *Physics Letters B*, 10 November 2020. <<https://www.sciencedirect.com/science/article/pii/S0370269320306171?via%3Dihub>>

