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A simple algorithm for Velocity Map Imaging systems[1] GEOFFREY HARRISON, Auburn Univ, JOHN VAUGHAN, BROCK HIDLE, GUILLAUME MARC LAURENT, Auburn University — In this work, we report a novel algorithm to reconstruct the three-dimensional (3D) momentum space picture of any charged particles collected with a Velocity Map Imaging system from the two-dimensional (2D) projected image captured by a detector [2]. The method uses the proper analytical two-dimensional projection function to retrieve the 3D distribution. The meaningful angle-correlated information is first extracted from the raw data by expanding the 2D image with a complete set of Legendre polynomials. Both the particle's angular and energy distributions are then retrieved from the expansion coefficients. The algorithm is simple, easy to implant, fast, and does not require any initial guess for the 3D distribution. In addition, our procedure explicitly takes into account the pixelization effect in the measurement [3].

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[2]B. J. Whitaker, Imaging in Molecular Dynamics: Technology and Applications (Cambrigde University Press, Cambridge, 2003).
[3]G. Harrison, J. Vaughan, B. Hidle, and G. M. Laurent, A simple algorithm for Velocity Map Imaging system, submitted

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