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The quasi-Bragg law, transforming the icoshedral diffraction pattern onto a hierarchic structure ANTONY BOURDILLON, UHRL — Previously, we have demonstrated [1]: 1) The golden section τ is as fundamental to the icosahedral structure (length /edge) as π is to the sphere (circumference /diameter). 2) The diffraction series are in restricted Fibonacci order because the ratio of adjacent terms f_n/f_{n-1} does not vary, but is the constant τ. The series is therefore geometric. 3) The matrix fcc Al is an approximant for i-Al_6Mn. 4) A three dimensional stereographic projection and a quasi-Bragg law are derived, correctly representing the diffraction series in powers of τ [2], without redundancy. 5) By the normal conventions of electron microscopy, the diffraction patterns are completely indexed in three dimensions. Now we describe significant consequences: 1) The diffraction pattern intensities near all main axes are correctly simulated, and all atoms are located on a specimen image. 2) The quasi-Bragg law has a special metric that we have measured. Atomic locations are consistently calculated for the first time. 3) Whereas the Bragg law transforms a crystal lattice into a reciprocal lattice in diffraction space, the quasi-Bragg law transforms a geometric diffraction pattern into a hierarchic structure. 4) Hyperspatial indexation [3] is superceded.

[1] Bourdillon, A.J., APS conference, Louis Obispo, Nov. 2-3 2012.
[2] Bourdillon, A. J., *Sol. State Comm.* **2009**, 149, 1221-1225.
[3] Duneau, M., and Katz, A., *Phys Rev Lett* **54**, 2688-2691

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