Neutron Scattering from Magnetically Frustrated Ruthenium Pyrochlores
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Spin-1 ruthenium pyrochlores feature strong exchange interactions and deeply suppressed Néel ordering. In addition a doping induced metallic phase has been demonstrated. I discuss neutron scattering experiments that explore the strongly frustrated quantum magnetism of Y$_2$Ru$_2$O$_7$ [1] and Pr$_{2-x}$Bi$_x$Ru$_2$O$_7$ [2]. In Y$_2$Ru$_2$O$_7$ ($\Theta_CW = -1100$ K, $T_N = 77$ K) much of the magnetic spectral weight is concentrated in a 20 meV spectral peak above an 11 meV low temperature gap in the excitation spectrum. In Pr$_{2-x}$Bi$_x$Ru$_2$O$_7$ magnetic order which occurs for $T < T_N = 160$ K when $x = 0$, is suppressed when the material becomes a metal for $x \approx 1$. I discuss the anomalous low energy spin dynamics associated with praseodymium for $x = 0$ and $x = 1$ and relate the results to other rare-earth pyrochlores.