THE DYNAMICS OF SOFT GAMMA REPEATERS

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Soft Gamma Repeaters (SGRs) are a rare class (4 known) of high energy transient that intermittently enter episodes of burst activity. Most SGRs are also sources of persistent X-ray emission where the flux is modulated at the rotation frequency ($\nu \sim 0.1-0.2$ Hz) of the underlying neutron star which is spinning down rapidly. During epochs of extreme burst activity, we have observed gross changes in their pulse profiles, pulse fractions, and persistent X-ray emission. Large variations in spindown torque have also been observed in two systems, however, these changes are not directly correlated with the burst activity. The collective properties of SGRs fit well with the idea that these are highly magnetized neutron stars or ‘magnetars’. Here, I will review the salient properties of SGRs paying particular attention to their dynamic behavior during burst activity. I will then discuss what implications this behavior has on the burst mechanism, magnetic field dynamics, and the nature of the torque variability.