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Keith Promislow*, Dept. of Mathematics, Michigan State University, A212 Wells Hall, East Lansing, MI 48824, and **Richard Moore**. *Semi-strong pulse interaction in thermally detuned P-NLS equation.*

We consider the semi-strong interaction of optical pulses in a thermally detuned optical parametric oscillator. The pulses evolve under a parametrically forced nonlinear Schrodinger equation coupled to a thermal profile generated by the optical heating. The thermal profile decays at a much slower spatial rate and provides for long-range interaction in what is effectively a three species, hyperbolic-parabolic, singularly perturbed system. We show that by controlling the commutator of a scaling operator and a spectral projection, that the associated semi-group is strongly contractive and use the RG machinery to derive interaction laws for N pulses comprised of optical pulse and long-range thermal envelope. (Received September 18, 2007)