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I will present models of the solar atmospheric response to flare heating. The models solve the equations of non-LTE radiation hydrodynamics with an electron beam added as a flare energy source term. Radiative transfer is solved in detail for many important optically thick hydrogen and helium transitions and numerous optically thin EUV lines making the models ideally suited to study the emission that is produced during flares. I will pay special attention to understanding key EUV lines as well the mechanism for white light production. I will also present preliminary results of how the model solar atmosphere responds to Fletcher & Hudson type flare heating. I will compare this with the results from flare simulations using the standard thick target model.