Glossary of Ionization/Recombination Terms

Christian asked me to produce a document of ionization/recombination processes, their definitions and inverse process. Here it is.

Auger Ionization: An inner shell electron is removed in an ionization event. This causes an electron in a higher energy level to relax, and the photon released by this radiative deexcitation can cause a second 'Auger' electron to be ejected. A subclass of autoionization.

Inverse?: The inverse here is a bit weird because this is a 'double process'- It would be a sequence of events where:

1. An electron recombines to a level other than the inner shell
2. It releases excess energy which radiatively excites a bound inner shell electron (so far this is just dielectronic recombination involving an inner shell excitation)
3. An electron would then recombine to the inner shell (!?)

I arrived at this by just following the Auger effect backwards, but it seems to me that this would never happen as you would never stay in the excited state long enough to recombine, as preferentially one of the exicted electrons would just relax to the inner shell instead. Raises an interesting question about what happens when you get inner shell ionization in LTE- presumably by definition you must also get inner shell recombination.

Autoionization: If one or more valence electrons are excited then one of them can relax to a lower energy level. The energy released can cause ionization of another electron. This is a form of non-stimulated ionization.

Inverse: Dielectronic recombination: An electron recombines with an atom, and instead of radiating the excess energy the energy causes a bound-bound radiative excitation of a bound electron.

Collisional Ionization: Ionization in which an electron directly ionizes via a collision.

Inverse: Collisional or Three Body Recombination: Recombination in which an electron (or presumably another particle is also feasible) carries off the excess energy released in a recombination event.

Photoionization: A photon imparts enough energy to an electron to ionize it.

Inverse: Radiative Recombination: Recombination in which a f-b photon carries off the excess energy released in a recombination event.