(2009), DIG spectra fall in the LINER zone of the BPT diagram. This means that heating in the DIG is more efficient than heating by massive stars in *classical* H II regions. Haffner et al. (2009) give a review of the possible heating sources: ionizing photons from leaking H II regions, shocks, dissipation of turbulence, magnetic reconnection etc... They also mention the possible role of pre-white dwarfs. Flores-Fajardo et al. (2011 and these proceedings) have shown that, the *expected* content of OB stars and HOLMES in the well observed edge-on spiral galaxy NGC 891 can well explain the observed emission-line characteristics of the extraplanar DIG in this galaxy. This galaxy was chosen because it offered the most complete set of observational constraints that should be fitted by the model and not because it is a special case. It is likely that HOLMES (complementing the radiation from OB stars in leaky H II regions) are indeed the right answer for the ionization of the DIG in all spiral galaxies.

2. THE FUTURE

So HOLMES provide a good and natural explanation to the problem of heating and ionization of gas in various galactic contexts. We know that HOLMES exist, and in large amounts. They provide sufficient numbers of ionizing photons to produce detectable emission lines. The high energies of these photons (roughly similar to those of a 10^5 K star), are able to yield LINER-like emission-line spectra. Of course, the ionizing radiation field from HOLMES can be easily dominated by other sources (massive stars or accreting black hole). But they provide a floor in W(Hα) below which no galaxy can be found (at least if it contains warm gas).

So far, studies of HOLMES in galaxy context have been scarce. A few recent works use integral field spectroscopy to distinguish between HOLMES and "little monsters" as an ionization source in early-type galaxies (Annibali et al. 2010; Sarzi et al. 2010). Progress on the theoretical side requires models for the complete evolution of low- and intermediate-mass stars at all metallicities, as well as synthetic stellar populations based on them and using relevant atmosphere models with appropriate chemical composition. The physics of advanced stages of stellar evolution is complex but progress is being made (Marigo et al. 2008; Weiss & Ferguson 2009). Another issue is the physical properties of the interstellar matter in early-type galaxies. The gas is believed to be essentially material lost trough winds from low- and intermediate mass stars, and thus should be enriched in carbon, nitrogen and dust. But its distribution within the galaxies is not known. Also, it is not clear why certain galaxies that stopped forming stars are line-less and others are not. One possibility is that gas may have been swept out of the galaxies by some dynamical process, another one is that all the gas remaining in the galaxy has been heated up to coronal temperatures.

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