

STAR FORMATION IN GALACTIC HALOS

P. Tissera^{1,2}, R. Dominguez-Tenreiro¹
and P. Goldsmith²

We report preliminary results of the study of galaxy formation in cosmological hydrodynamics simulations which include a star formation algorithm (Tissera et al. 1996, submitted MNRAS). These simulations correspond to a standart Cold Dark Matter universe of a typical region of the Universe using $N = 64^3$ particles with $\Omega_b = 0.1, b = 2.5, L = 10$ Mpc and $H = 50 \text{ km s}^{-1} \text{ Mpc}$. Supernova feedback mechanisms have not been considered.

We focused our analysis on the study of the relation between the star formation processes and the merger/accretion events. The evolutionary history of each galactic object identified at $z = 0$ was followed as a function of the look-back time. Our simulations allow us to have the history of star formation in each progenitor object and its satellites. We found that in all cases there is an increase of star formation when a merger with a clump of more than 10% the progenitor mass occurred. As an example to show the different evolutionary path of each galactic object, we compared in this poster the history of star formation and mergers of three objects identified at $z = 0$: a spheroidal and two disk-likes. On average, the disk-like objects suffer one or two mayor mergers with a satellite with mass greater than 10% of the progenitor mass, whereas the spheroidal object suffers three encounters with clumps of 95%, 38% and 11% of the progenitor mass, along their evolution. A more detailed description of the properties of the galactic halos and their dependence on the models are being carried out by Tissera & Dominguez.

¹ Departamento de Física Teórica, Universidad Autónoma de Madrid, Spain.

² Astrophysics Group, Imperial College, UK.

THE X-RAY TO RADIO ENERGY DISTRIBUTION OF STARBURST, NORMAL AND ACTIVE GALAXIES

H. R. Schmitt^{1,2,3}, A. L. Kinney¹, D. Calzetti¹,
and T. Storchi-Bergmann²

We present the results of an extensive literature search of multiwavelength data for a sample of 59 galaxies, composed of 26 Starbursts, 15 Seyfert 2's, 5 LINER's, 6 normal spirals and 7 elliptical galaxies. The data contain soft X-ray fluxes, ultraviolet and optical spectra, near, mid and far infrared photometry and radio measurements, selected to match as closely as possible the *IUE* aperture (10×20 arcsec). The galaxies were separated into 6 groups with

similar morphological or activity properties, namely, Normal Spirals, Normal Ellipticals, LINER's, Seyfert 2's, Low reddening Starbursts ($E(B - V) < 0.4$) and High reddening Starbursts ($E(B - V) > 0.4$). For each one of these groups we created average spectral energy distributions (SED), which were then compared to look for similarities and differences.

We conclude that one can use the SED's to distinguish between two pairs of activity classes. Seyfert 2's have markedly different mid and far-IR fluxes from LINER's. Starbursts of Low and High reddening can be distinguished based on their UV and far-IR emission, because of the dust absorption (in the UV) and emission (in the far-IR). Within our uncertainties, the SED's of Normal Ellipticals and Spirals are similar over the entire wavelength range. The SED of normal galaxies can be distinguished from those of active ones (Starbursts, LINER's and Seyfert 2's) by the lower mid and far-IR, and UV emission, relative to the visual. The SED's of Low and High reddening Starbursts can be easily differentiated from those of LINER's and Seyfert 2's based on their larger UV/visual ratio.

¹ Space Telescope Science Institute, Baltimore, USA.

² IF-UFRGS, Porto Alegre, Brazil.

³ CNPq Fellow.

MASS-LOADED MODELS OF ULTRACOMPACT H II REGIONS

R. J. R. Williams^{1,2}, M. P. Redman¹
and J. E. Dyson²

Our understanding of the early evolution of stellar H II regions is undergoing a revolution. Radio observations of the very youngest regions, which are still swathed in molecular material, find very compact structures in far higher numbers than would be expected from the 'classical' theory. A wide range of morphologies are found for these regions — many theoretical models have been proposed to explain their properties.

We have modelled the regions as the result of the interaction between a young, massive star and the clumpy molecular material which surrounds it. This model naturally explains the observed shapes of many of these regions. In particular, the widely-discussed 'cometary' morphology can be explained by a gradient in the intensity of mass-loading, without requiring large stellar velocities. The models predict kinematical structures which can be compared with forthcoming observations. For details, see the references below.

Mass-loading will also be important in many other types of ionized region (for instance older stellar H II

regions, and those around starbursts and active nuclei). Many aspects of our models of ultracompact H II regions may carry over into these related objects.

Dyson, J. E., Williams, R. J. R., & Redman, M. P.
1995, MNRAS, 277, 700

Redman, M. P., Williams, R. J. R., & Dyson, J. E.
1996, MNRAS, 280, 661

Williams, R. J. R., Dyson, J. E., & Redman, M. P.
1996, MNRAS, 280, 667

¹ Department of Physics and Astronomy, University of Manchester, UK.

² Department of Physics and Astronomy, University of Leeds, UK.

LIST OF ABSTRACTS

ON THE OPTICAL FEATURELESS CONTINUUM IN AGN *M. Joly, C. Boisson, & M. Serote Roos* 247

SYNTHESIZING STELLAR POPULATIONS: THE STARBURST GALAXY NGC 3310 *M. Serote Roos, C. Boisson, & M. Joly* 247

NEW STRONG Fe II EMITTERS IN AGN FROM THE 2nd BYURAKAN SKY SURVEY *V. H. Chavushyan, L. K. Erastova, & J. A. Stepanian* 248

IR OBSERVATIONS OF AGNs *J. Guichard, M. A. Malkan, & I. S. McLean* 249

H I OBSERVATIONS OF SPIRAL GALAXIES IN THE CLUSTER A 262 *H. Bravo, V. Cayatte, A. Szomoru, R. Sancisi, & C. Balkowski* 249

IS THE STARBURST IN AGN REALLY TRIGGERED BY INTERACTION? *H. M. Tovmassian* 250

HST OBSERVATIONS OF THE ULTRALUMINOUS IR GALAXIES *K. D. Borne, H. Bushouse, L. Colina, & R. A. Lucas* 250

OPTICAL VARIABILITY OF ACTIVE GALACTIC NUCLEI *L. Sodr  Jr. & A. Garcia* 251

INVESTIGATIONS OF THE INTERACTION-ACTIVITY CONNECTION *K. D. Borne* 251

MARGINALLY BOUND COLLISIONS LEADING TO STARBURST ACTIVITY *T. K. Chatterjee* 252

DWARF GALAXIES AROUND ULTRALUMINOUS IRAS GALAXIES *H. J. Deeg, C. Mu oz-Tu on, G. Tenorio-Tagle, E. Telles, J. M. Rodr guez-Espinosa, & J. M. Vilchez* 252

3-DIMENSIONAL MHD MODELLING OF JETS: STABILITY AND COLLIMATION *E. M. de Gouveia Dal Pino & A. H. Cerqueira* 253

- OPTICAL VARIABILITY OF QSOs: THE STARBURST, ACCRETION DISK AND MICROLENSING PARADIGMS *S. Cristiani, S. Trentini, F. La Franca, I. Aretzaga, & P. Andreani* 253
- THE EVOLUTION OF THE MERGING RATE OF NEUTRON STAR BINARIES IN ELLIPTICAL GALAXIES *G. A. Medina Tanco & A. C. S. Friaça* 254
- A SPECTRAL STUDY OF CLUMPY IRREGULAR GALAXIES *A. N. Burenkov* 254
- FIRST LIGHT ON AN IR BRIGHT GALAXY USING THE ISO LONG WAVELENGTH SPECTROMETER: THE ANTENNAE *J. Fischer, L. M. Shier, M. L. Luhman, S. Satyapal, H. A. Smith, G. J. Stacey, S. J. Unger, M. A. Greenhouse, L. Spinoglio, M. A. Malkan, S. D. Lord, J. W. Miles, M. A. Shure, P. E. Clegg, P. A. R. Ade, C. Armand, M. Burgdorf, S. Church, G. R. Davis, A. Di Giorgio, D. Ewart, I. Furniss, W. M. Glencross, C. Gry, T. Lim, S. Molinari, Q. Nguyen-Rieu, M. C. Price, S. D. Sidher, A. Smith, B. M. Swinyard, D. Texier, N. R. Trams, & M. G. Wolfire* 255
- ON THE QUESTION OF THE INTERACTION OF HIGH AND LOW VELOCITY GAS SYSTEMS IN THE GALAXY NGC 1275 *I. Pronik & L. Metik* 256
- ISO-SWS SPECTRA OF THE GALACTIC CENTER: IMPLICATIONS FOR OTHER GALAXIES *D. Lutz, H. Feuchtgruber, R. Genzel, D. Kunze, & D. Rigopoulou* 257
- A STUDY OF THE STELLAR POPULATIONS IN NEARBY STARBURSTS *S. Satyapal, M. A. Greenhouse, H. A. Smith, W. J. Forrest, J. L. Pipher, D. M. Watson, J. Fischer, & C. E. Woodward* 257
- RADIO CONTINUUM OBSERVATIONS OF THE STARBURST GALAXY NGC 2146 *U. Lisenfeld, P. Alexander, G. G. Pooley, & T. Wilding* 258
- HOW MANY ACTIVE COMPONENTS CAN A GALAXY HAVE? *T. L. Hill, C. A. Heisler, & R. W. Hunstead* 258
- NEAR-INFRARED LINE OBSERVATIONS OF STARBURST GALAXIES *H. Sugai, M. A. Malkan, I. S. McLean, R. I. Davies, & M. J. Ward* 259
- STARBURST AND AGN DIAGNOSTICS FROM INFRARED SPECTROSCOPY *J. D. Goldader* 259
- OBSERVATIONS AND MODELING OF NUCLEAR STARBURSTS *C. W. Engelbracht, M. J. Rieke, & G. H. Rieke* 260
- CIRCUMNUCLEAR STARBURSTS IN BARRED GALAXIES: H α IMAGES *J. A. García-Barreto, J. Franco, & R. Carrillo* 260
- POWERING OPTICAL FILAMENTS IN COOLING FLOWS WITH ALFVÉN WAVES *D. R. Gonçalves, A. C. S. Friaça, L. C. Jafelice, V. Jatenco-Pereira, & R. Opher* 260
- STAR FORMATION IN NUMERICAL SIMULATIONS *J. Gerritsen & V. Icke* 261
- DIAGNOSTICS OF ISO-SWS SPECTRA OF STARBURST AND ULTRALUMINOUS GALAXIES *D. Kunze, D. Rigopoulou, & D. Lutz* 261
- THE OCULAR GALAXY NGC 2535 AND ITS SMALL STARBURST COMPANION NGC 2536 *M. Kaufman, E. Brinks, D. M. Elmegreen, M. Thomasson, B. G. Elmegreen, C. Struck, & M. Klarić* 262
- ISO OBSERVATIONS OF AGN *J. M. Rodríguez Espinosa & A. M. Pérez García* 262
- NEAR-INFRARED VIEW OF THE NUCLEAR STARBURST REGION OF NGC 1808 *J. Kotilainen, D. Forbes, A. Moorwood, P. van der Werf, & M. Ward* 262
- STARBURSTS INDUCED BY INTERACTIONS IN GROUPS OF GALAXIES *J. Iglesias-Páramo & J. M. Vilchez* 263
- STARBURST-BLACK HOLE MODELS OF ACTIVE GALACTIC NUCLEI *R. J. R. Williams, A. C. Baker, & J. J. Perry* 263
- INFRARED IMAGES OF WEAK RADIO GALAXIES *I. Cruz-González, L. Salas, & R. Carrillo* 264
- ABOUT THE INITIAL MASS FUNCTION AND He II EMISSION IN YOUNG STARBURSTS *D. Schaerer* 264
- H II REGION POPULATION IN NEARBY GALAXIES WITH NUCLEAR ACTIVITY *R. M. González Delgado & E. Pérez* 264
- TRACING EXTRAGALACTIC SNRs VIA ADVANCED IR FABRY-PEROT IMAGING *M. A. Greenhouse, S. Satyapal, C. E. Woodward, J. Fischer, K. L. Thompson, W. J. Forrest, J. Pipher, H. A. Smith, & D. M. Watson* 265
- BVR-PHOTOMETRY OF THE COMPACT OBJECTS INTERACTING WITH THE NUCLEI OF ACTIVE GALAXIES *I. Pronik, L. Sharipova, & V. Prokoféva* 265
- STAR FORMATION IN GALACTIC HALOS *P. Tissera, R. Dominguez-Tenreiro, & P. Goldsmicht* 266
- THE X-RAY TO RADIO ENERGY DISTRIBUTION OF STARBURST, NORMAL AND ACTIVE GALAXIES *H. R. Schmitt, A. L. Kinney, D. Calzetti, & T. Storchi-Bergmann* 266
- MASS-LOADED MODELS OF ULTRACOMPACT H II REGIONS *R. J. R. Williams, M. P. Redman, & J. E. Dyson* 266