

# Twinkle little stars: Massive stars are quenched in strong magnetic fields

Fatemeh S. Tabatabaei<sup>1</sup>, M. Almudena Prieto<sup>2</sup> and  
Juan A. Fernández-Ontiveros<sup>3</sup>

<sup>1</sup>Instituto de Astrofísica de Canarias, Vía Láctea S/N, E-38205 La Laguna, Spain  
School of Astronomy, Institute for Research in Fundamental Sciences, 19395-5531 Tehran, Iran  
email: [ftaba@ipm.ir](mailto:ftaba@ipm.ir)

<sup>2</sup>Instituto de Astrofísica de Canarias, Vía Láctea S/N, E-38205 La Laguna, Spain  
Departamento de Astrofísica, Universidad de La Laguna, E-38206 La Laguna, Spain  
email: [aprieto@iac.es](mailto:aprieto@iac.es)

<sup>3</sup>Instituto de Astrofísica de Canarias, Vía Láctea S/N, E-38205 La Laguna, Spain  
Departamento de Astrofísica, Universidad de La Laguna, E-38206 La Laguna, Spain  
email: [jafo@iac.es](mailto:jafo@iac.es)

**Abstract.** The role of the magnetic fields in the formation and quenching of stars with different mass is unknown. We studied the energy balance and the star formation efficiency in a sample of molecular clouds in the central kpc region of NGC 1097, known to be highly magnetized. Combining the full polarization VLA/radio continuum observations with the HST/H $\alpha$ , Pa $\alpha$  and the SMA/CO lines observations, we separated the thermal and non-thermal synchrotron emission and compared the magnetic, turbulent, and thermal pressures. Most of the molecular clouds are magnetically supported against gravitational collapse needed to form cores of massive stars. The massive star formation efficiency of the clouds also drops with the magnetic field strength, while it is uncorrelated with turbulence (Tabatabaei *et al.* 2018). The inefficiency of the massive star formation and the low-mass stellar population in the center of NGC 1097 can be explained in the following steps: I) Magnetic fields supporting the molecular clouds prevent the collapse of gas to densities needed to form massive stars. II) These clouds can then be fragmented into smaller pieces due to e.g., stellar feedback, non-linear perturbations and instabilities leading to local, small-scale diffusion of the magnetic fields. III) Self-gravity overcomes and the smaller clouds seed the cores of the low-mass stars.

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## Reference

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