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Theory of Feedback in Clusters and Molecular Cloud Turbulence

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(Submitted on 25 Oct 2010)

I review recent numerical and analytical work on the feedback from both low- and high-mass cluster stars into their gasoeus environment. The main conclusions are that i) outflow driving appears capable of maintaing the turbulence in parsec-sized clumps and retarding their collapse from the free-fall rate, although there exist regions within molecular clouds, and even some examples of whole clouds, which are not actively forming stars, yet are just as turbulent, so that a more universal turbulence-driving mechanism is needed; ii) outflow-driven turbulence exhibits specific spectral features that can be tested observationally; iii) feedback plays an important role in reducing the star formation rate; iv) nevertheless, numerical simulations suggest that feedback cannot completely prevent a net contracting motion of clouds and clumps. Therefore, an appealing source for driving the turbulence everywhere in GMCs is the accretion from the environment, at all scales. In this case, feedback's most important role may be to prevent a fraction of the gas nearest to newly formed stars from actually reaching them, thus reducing the star formation efficiency.

Comments:	8 pages, no figures. Invited review for IAU symposium 270 'Computational star formation', Ed., J. Alves, B. Elmegreen, J. Girart, V. Trimble
Subjects:	**Galaxy Astrophysics (astro-ph.GA)**
Cite as:	**arXiv:1010.5157v1 [astro-ph.GA]**

Submission history

From: Enrique Vazquez-Semadeni [view email]
[v1] Mon, 25 Oct 2010 15:05:52 GMT (26kb)

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