

## **Feathering Instability in Spiral Arms**

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A theoretical framework is developed to understand the substructure of spiral arms in galaxies and its relation to the formation of Giant Molecular Clouds (GMCs) and massive stars. In particular, we showed that the quasi-periodic gas density enhancements along the spiral arms, which are called feathers, can be formed by the instability of spiral shock. Such feathering instability may trigger the formation of GMCs by the gravitational collapse of high density regions. Theoretical predictions from the analytical framework will help astronomers understand the role of spiral density wave in galaxies.