A Wish List for Cosmic Ray Feedback

- Propagation model:
  - Self confinement: scattering by waves amplified by cosmic ray driven instabilities?

    Or
  - Scattering by waves generated through a turbulent cascade?

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Extrinsic Turbulence

- Advection by the thermal gas, diffusion, & possibly stochastic acceleration.
- CR transfer momentum to the gas through their pressure gradient.
- B need not actually be modeled
- Empirically chosen diffusivity & acceleration rates are somewhat a*d hoc*.

Self Confinement

- Stream relative to the gas at a rate determined by marginal stability criterion for waves (thermal damping balances cosmic ray driving).
- Transfer momentum through pressure gradient and heat through wave excitation.
- Demands understanding of wave damping & an **accurate magnetic field model**.
- Theory of self confinement near sources still needed.

The Transport Model Matters

- Puffed up galactic disk, or wind?
- Degree of star formation suppression?
- Parker instability or not?
- Thermally stable, or not?
- Bottleneck?
- Weakly ionized gas driven, or not?
- Outcomes of diffusive shock acceleration?

The Energy Spectrum

- Fluid theory integrates over energy – bulk properties heavily weighted to particles of a few GeV *(except near sources, which can be layered)*
- Observational predictions depend on resolving energy dependence of diffusion & streaming.