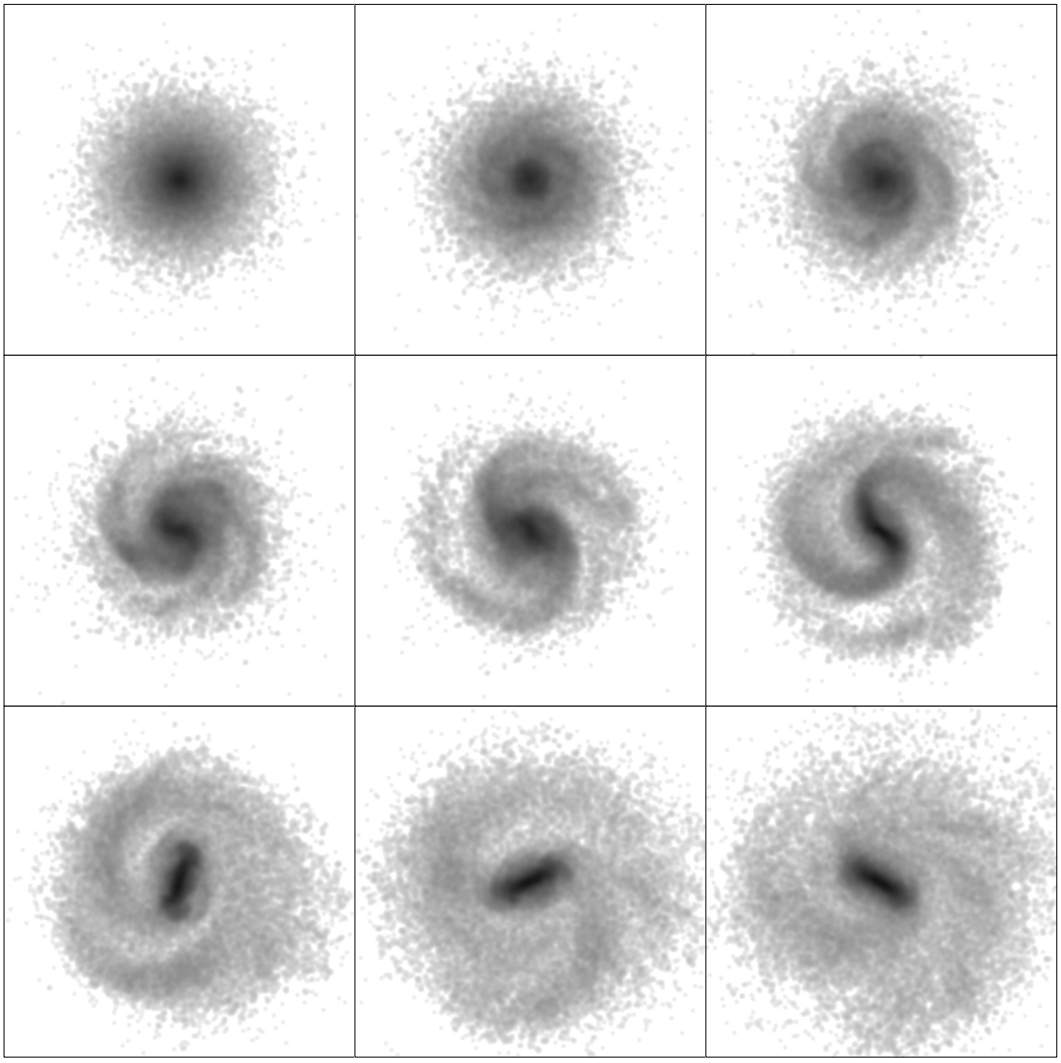

Figure 19.1: Bar instability in a model disk galaxy. This model is similar to the one shown in Fig. 18.2, but here the disk comprises 75% of the total mass.

waves are absorbed if they encounter an ILR; thus to get through, the wave's pattern speed must exceed the maximum of $\Omega - \kappa/2$ so that no ILR exists. This is the same condition on the pattern bar's speed just reached by considering available orbits in weak bar potentials. In numerical simulations the emerging bar in fact rotates faster than the peak value of $\Omega - \kappa/2$ (Sellwood 1981, Sparke & Sellwood 1987); this is evidence that tunneling through the center completes the feedback loop in bar-unstable disks.

To cure disk galaxies of the bar instability, one can

- lower the gain of the swing-amplifier by placing much of the mass in a dark halo (Ostriker & Peebles 1973),
- cut the feedback loop by increasing the central velocity dispersion, so that in-going waves are heavily damped before they emerge, or