



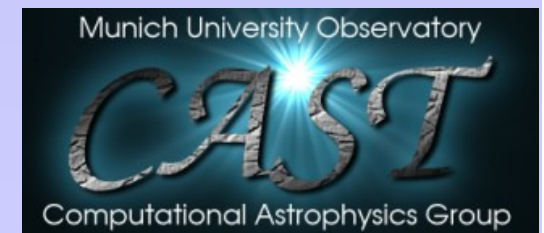
# Sauron's Challenge of Elliptical Galaxy Formation

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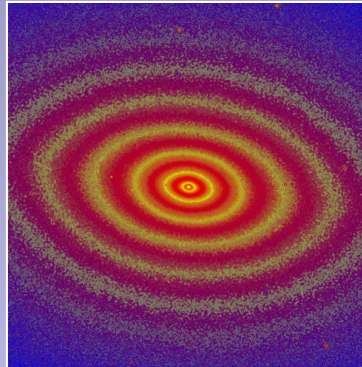
In collaboration with

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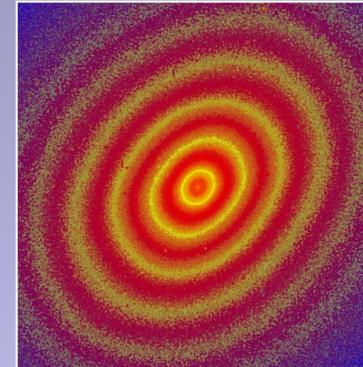


## *Testing the Major Merger Scenario*

Disky

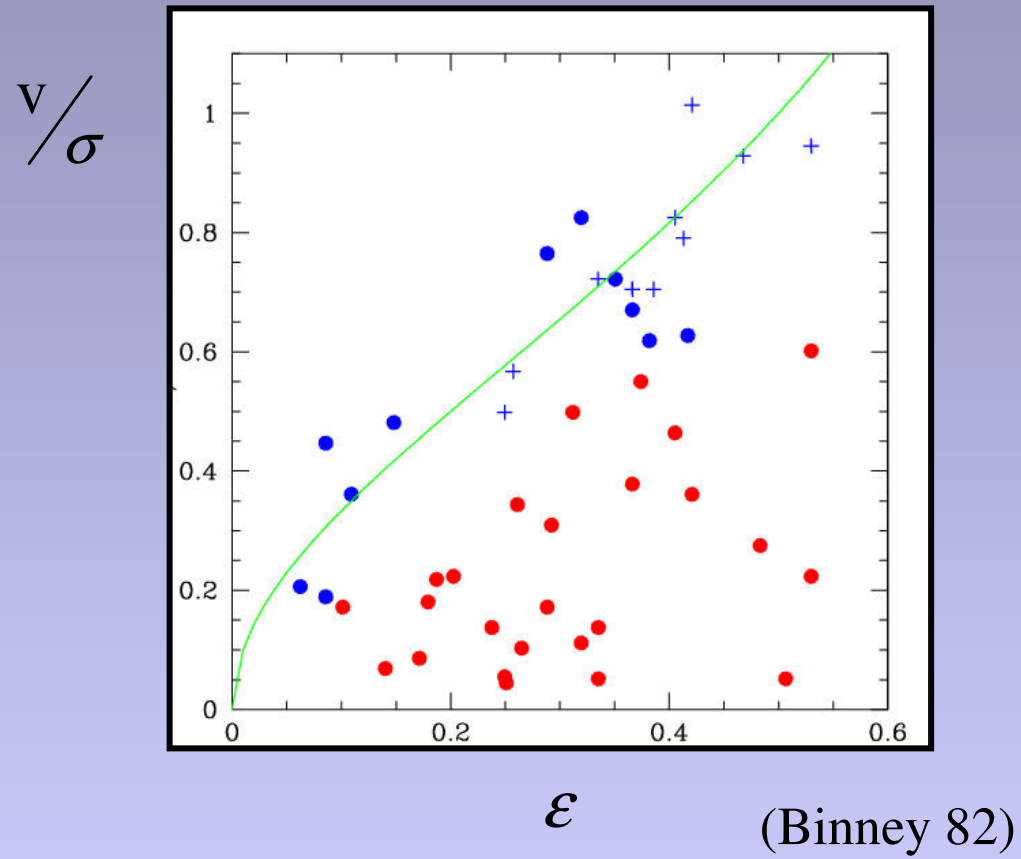


Boxy



- **Mass:**  $M_* < \text{few} * 10^{11} M_{\odot}$        $M_* \geq \text{few} * 10^{11} M_{\odot}$
- **Kinematics:** isotropic, fast rotators      anisotropic, slow rotators
- **Core properties:** steep profiles      flat profiles
- **X-ray properties:** X-ray silent      X-ray loud

# *The Anisotropy Diagram*



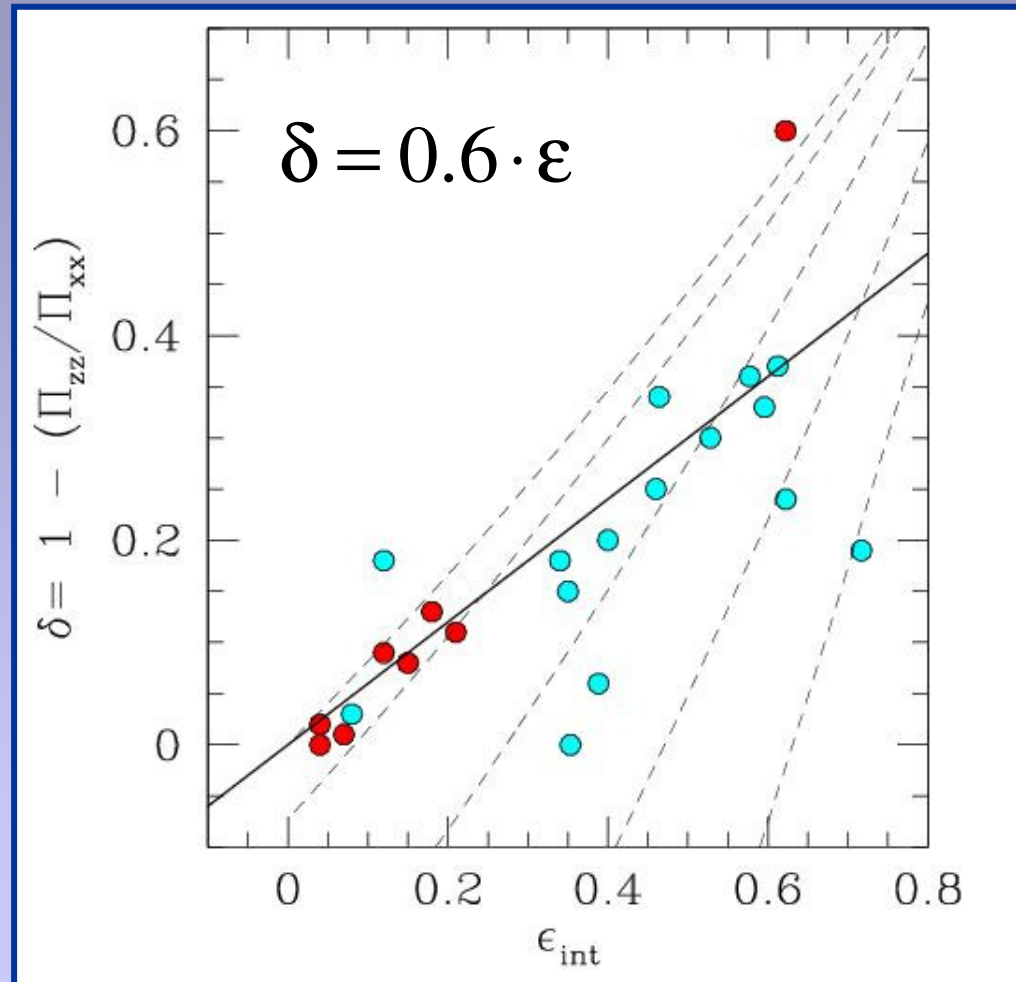
# Results of the SAURON analyses

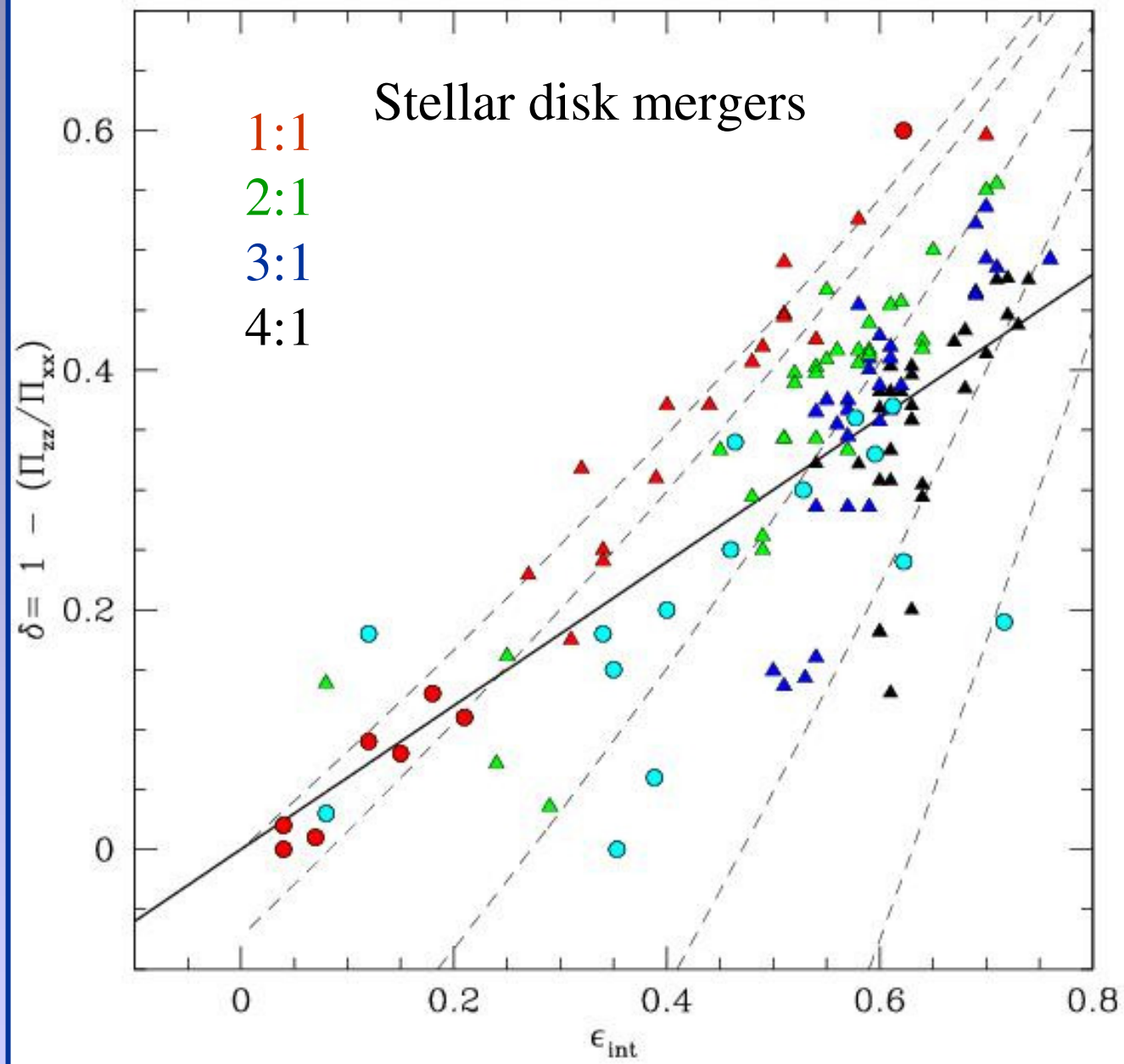
(Cappellari et al. 2007; astro-ph/0703533)

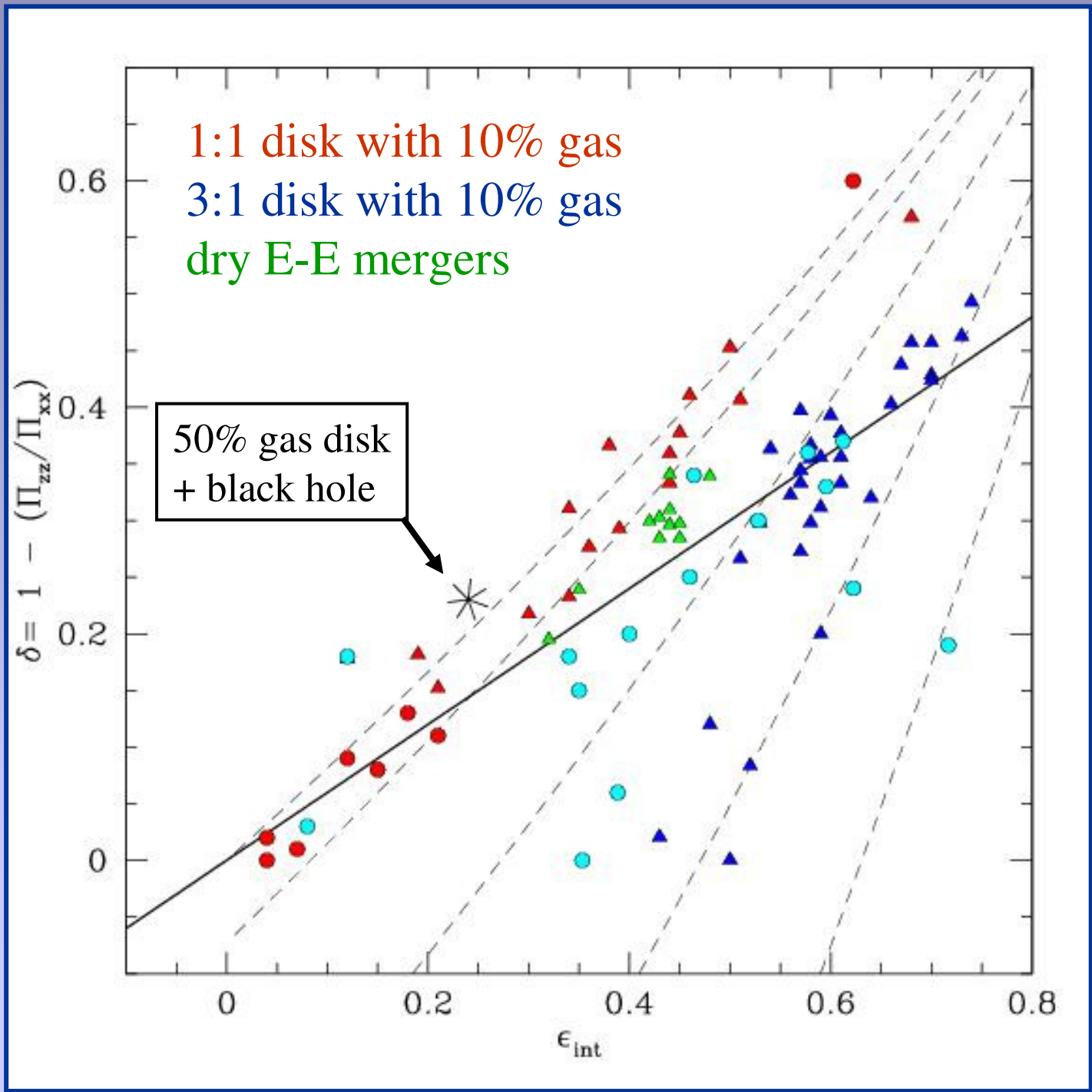
- **24 ellipticals** analysed
- SAURON **integral field kinematics** determined within 1 effective radius
- **Axisymmetric 3-integral Schwarzschild models**

→ Kinematics of the 50% most bound particles

$$\delta \equiv \frac{\Pi_{xx} - \Pi_{zz}}{\Pi_{zz}}$$





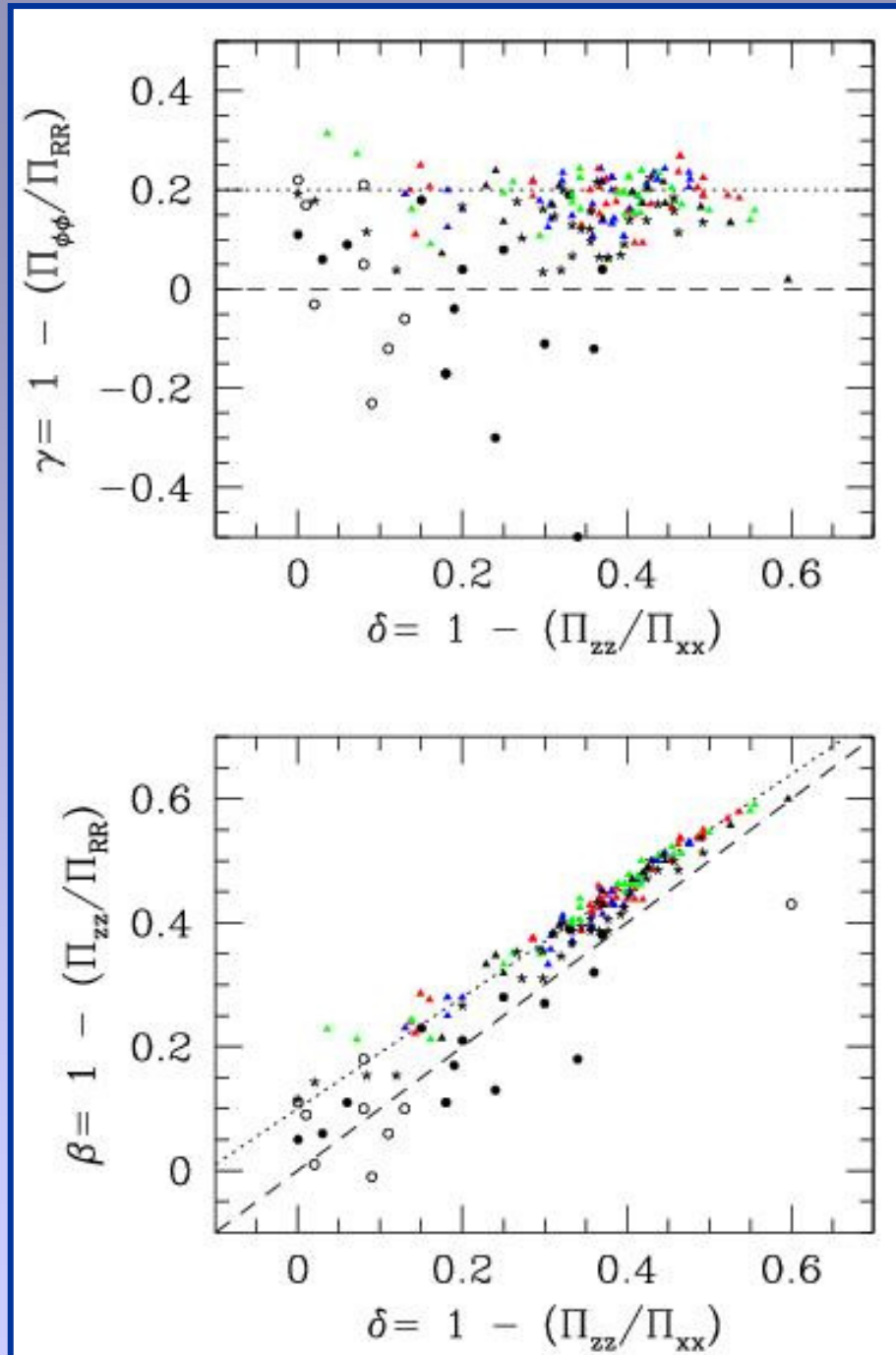


$$\delta \equiv \frac{\Pi_{xx} - \Pi_{zz}}{\Pi_{xx}}$$

$$\beta \equiv \frac{\Pi_{RR} - \Pi_{zz}}{\Pi_{RR}}$$

$$\gamma \equiv \frac{\Pi_{RR} - \Pi_{\Phi\Phi}}{\Pi_{RR}}$$

$$\delta = \frac{2\beta - \gamma}{2 - \gamma}$$



## *Conclusions*

- **The observed correlation cannot be reproduced by gas-poor or gas-rich disk galaxy mergers**
- **Dry early-type mergers cannot reproduce the kinematical properties of massive, red, slowly rotating ellipticals**
- **The origin of the disagreement is not clear yet:**
  - Observational bias?
  - A problem with current Schwarzschild models?
  - A failure of the major merger scenario indicating additional physical processes that shape early-type galaxies?