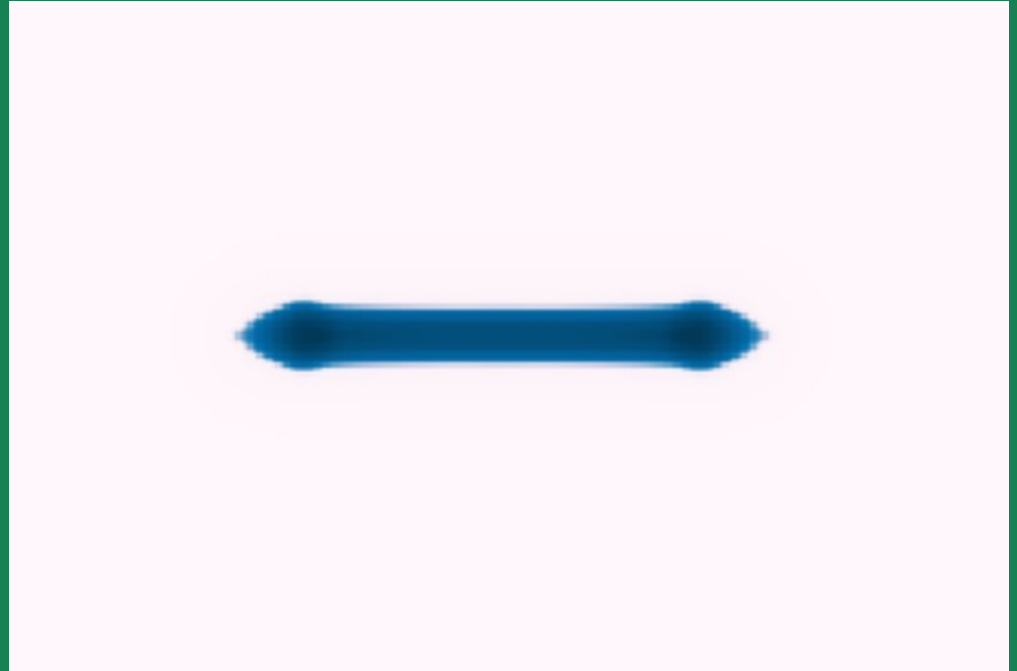


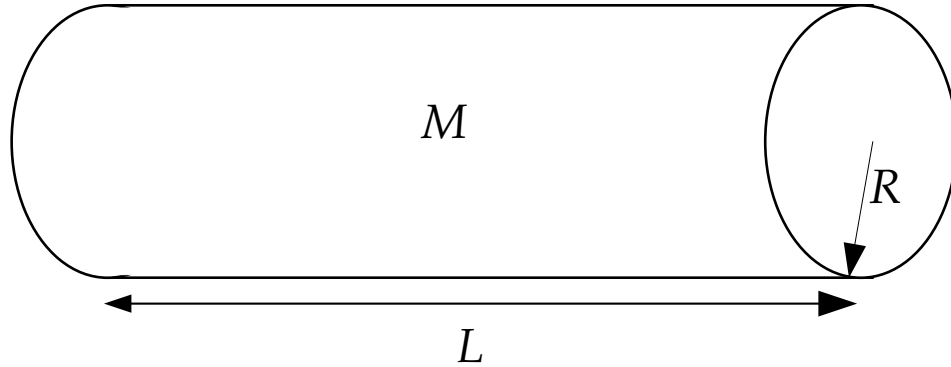
The puzzle of the edge effect – a tale with two ends



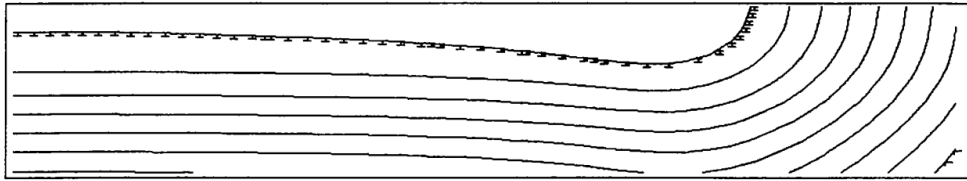
Central question:

Why don't we observe strong core/star formation at the ends of all filaments?

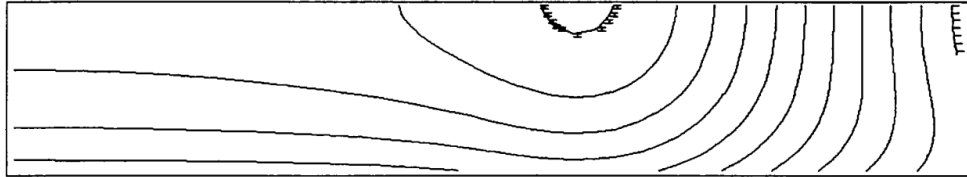
How do isolated filaments evolve?



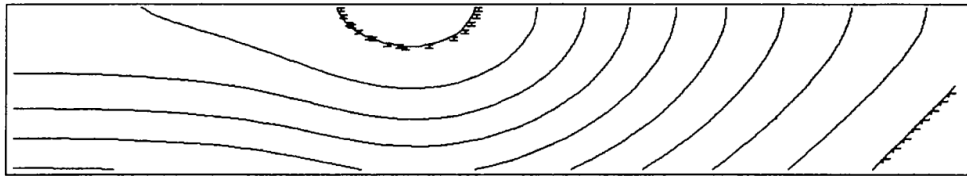
The filament ends sweep up material



T=3.0E13 CYCLE 59 MIN= $1.8E-21$ MAX= $1.0E-20$ DQ=1.18



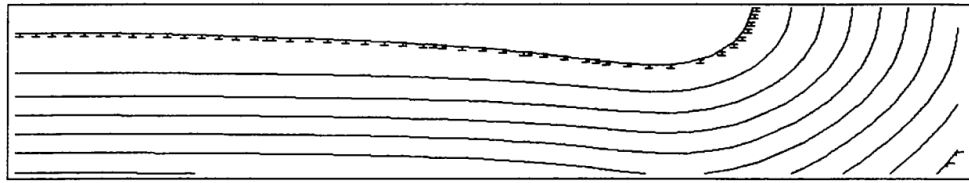
T=4.0E13 CYCLE 81 MIN= $1.6E-21$ MAX= $8.7E-21$ DQ=1.18



T=6.0E13 CYCLE 138 MIN= $1.0E-21$ MAX= $1.4E-20$ DQ=1.29

Bastien 1983

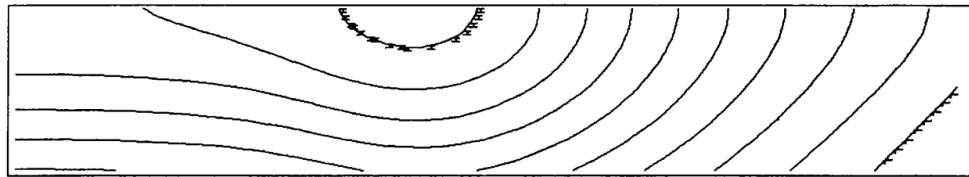
The filament ends sweep up material



T=3.0E13 CYCLE 59 MIN=1.8E-21 MAX=1.0E-20 DQ=1.18

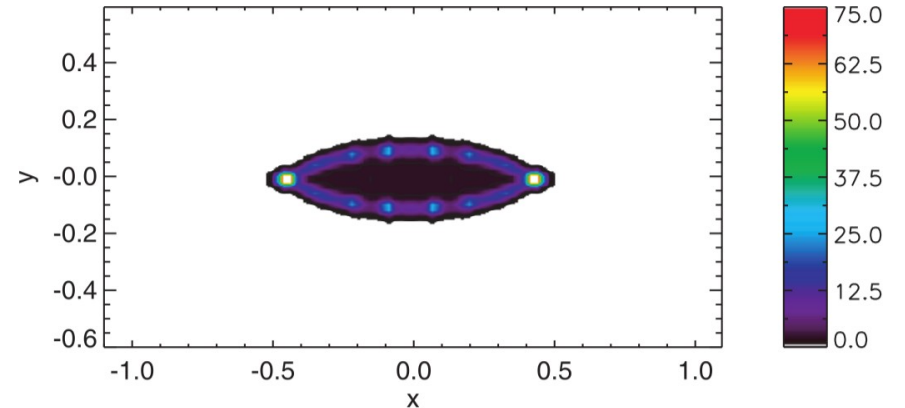
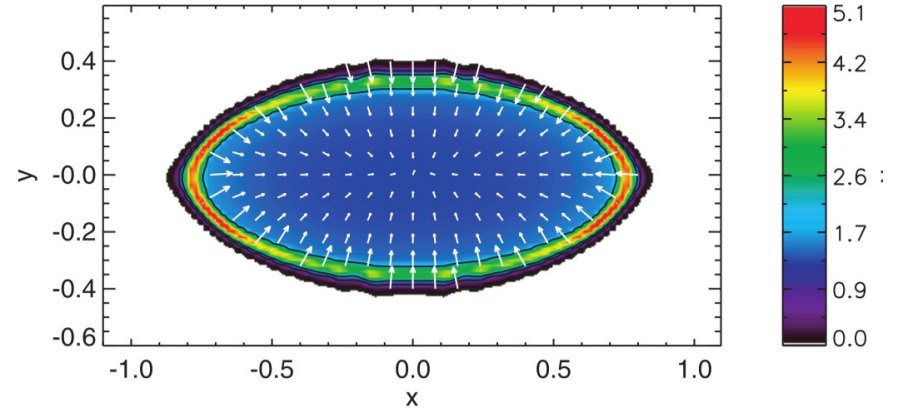


T=4.0E13 CYCLE 81 MIN=1.6E-21 MAX=8.7E-21 DQ=1.18



T=6.0E13 CYCLE 138 MIN=1.0E-21 MAX=1.4E-20 DQ=1.29

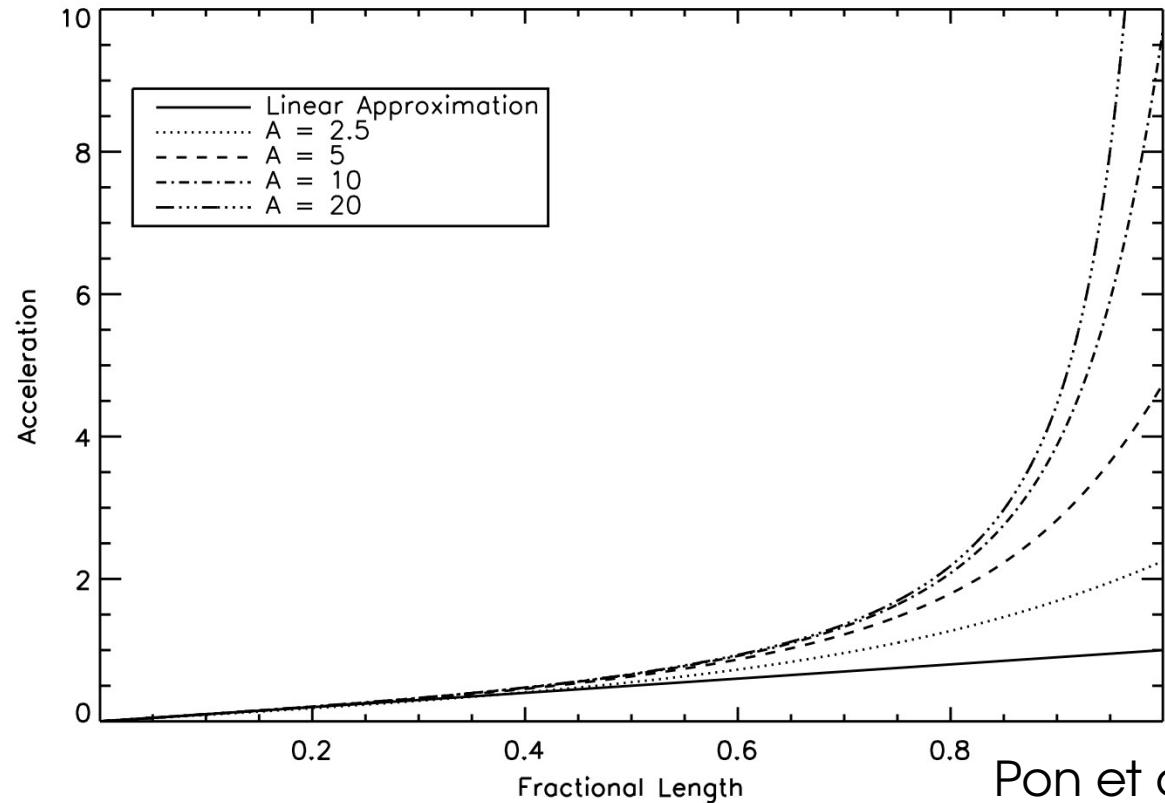
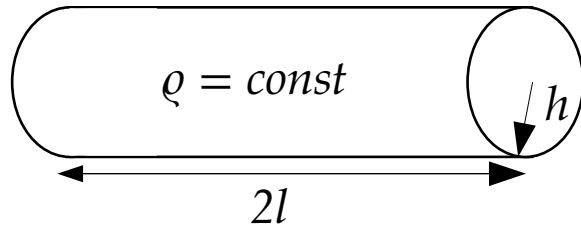
Bastien 1983



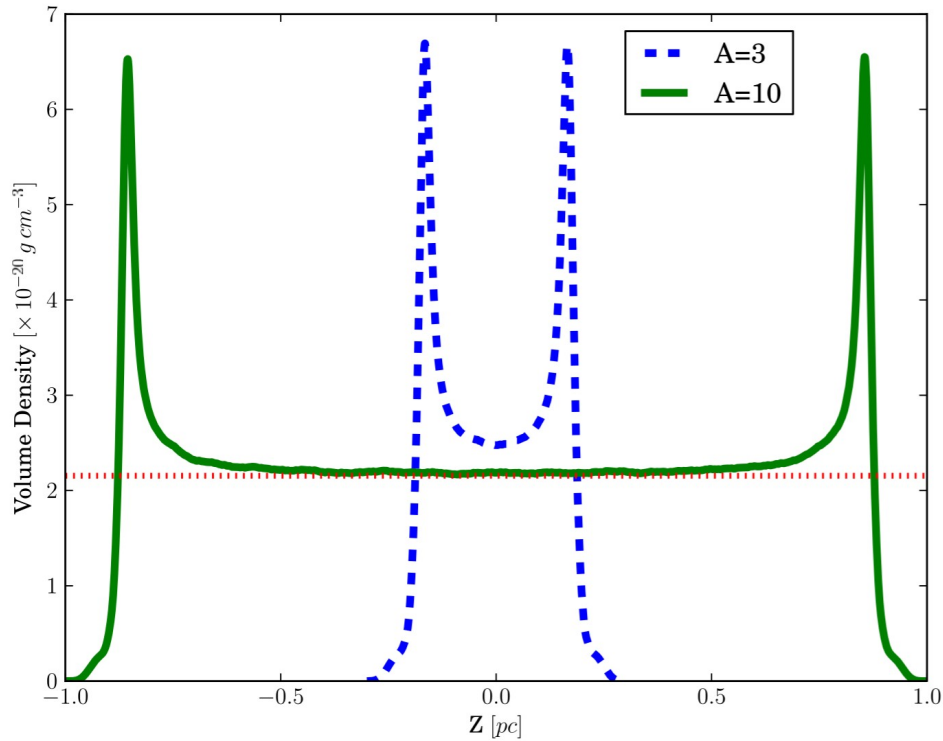
Burkert & Hartmann 2004

Acceleration shows sharp increase at ends

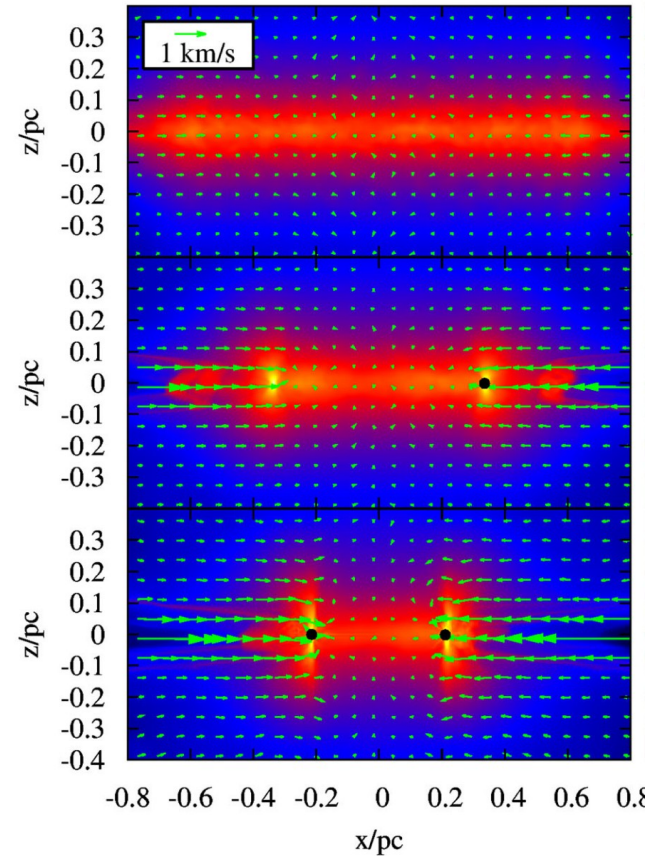
$$a_z = -2\pi G\rho \left\{ 2z - [h^2 + (l+z)^2]^{1/2} + [h^2 + (l-z)^2]^{1/2} \right\} \quad \text{Burkert \& Lee 2004, Toalá et al. 2012}$$



Edge effect results in fast end core growth



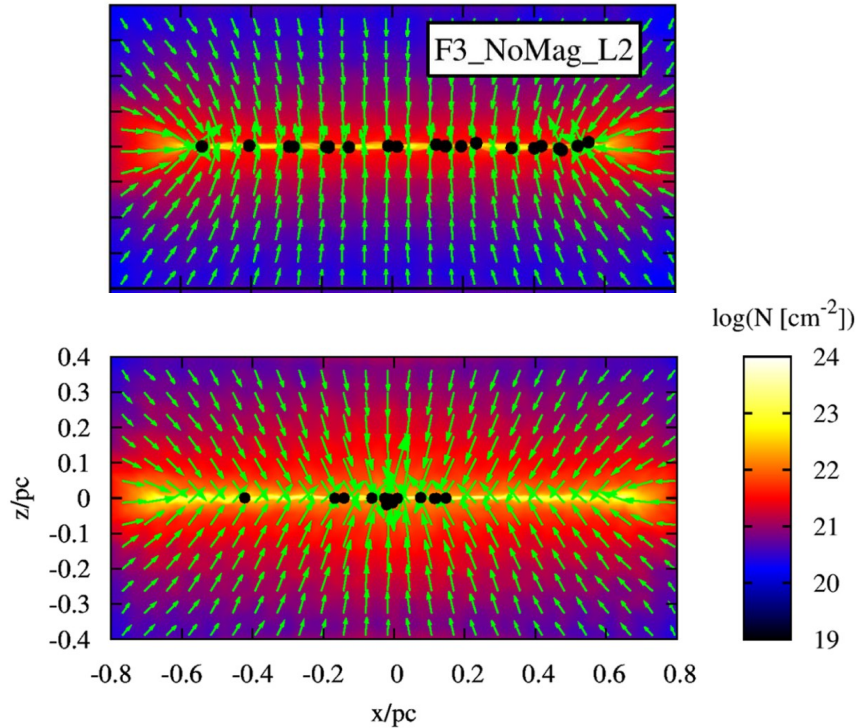
Clarke and Whitworth 2015,
see also Bastien et al. 1991



Seifried and Walch 2015

Line-mass influences where cores form first

Large line-mass, $M/L \gtrsim 1 M/L_{\text{crit}}$

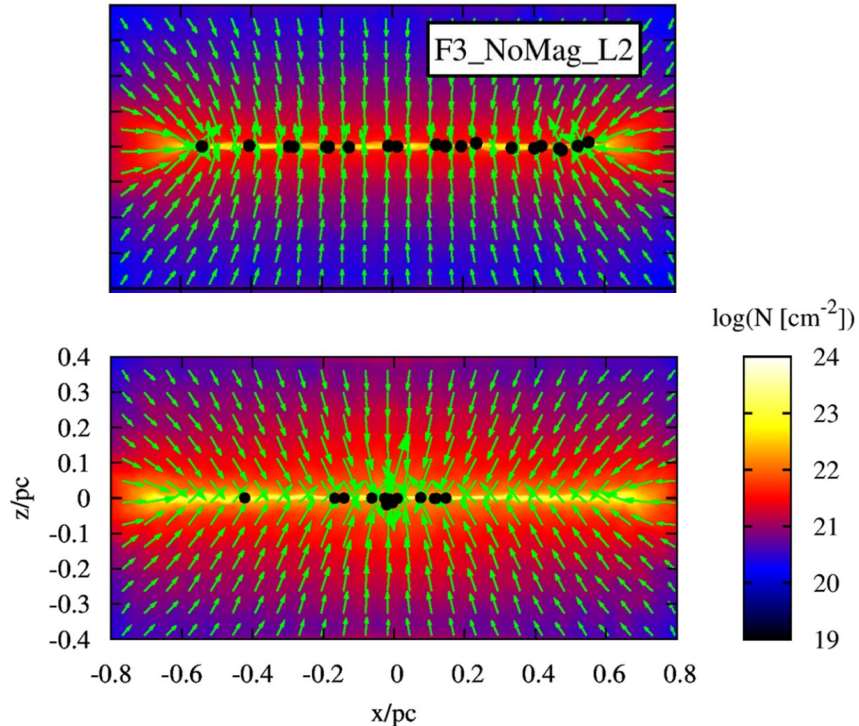


Seifried and Walch 2015

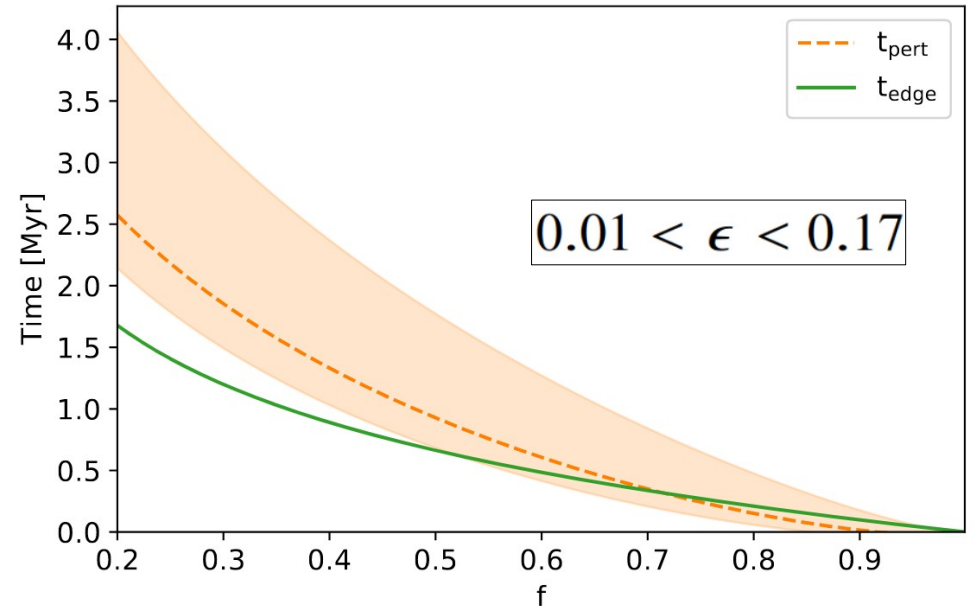
Line-mass influences where cores form first

Large line-mass, $M/L \gtrsim 1 M/L_{\text{crit}}$

Low line-mass, $M/L \lesssim 1 M/L_{\text{crit}}$



Seifried and Walch 2015

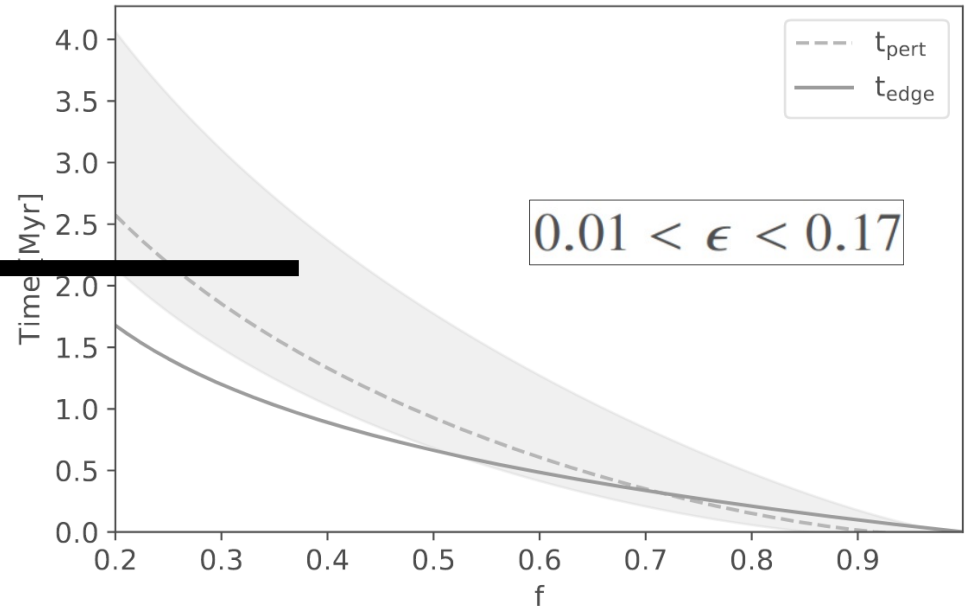
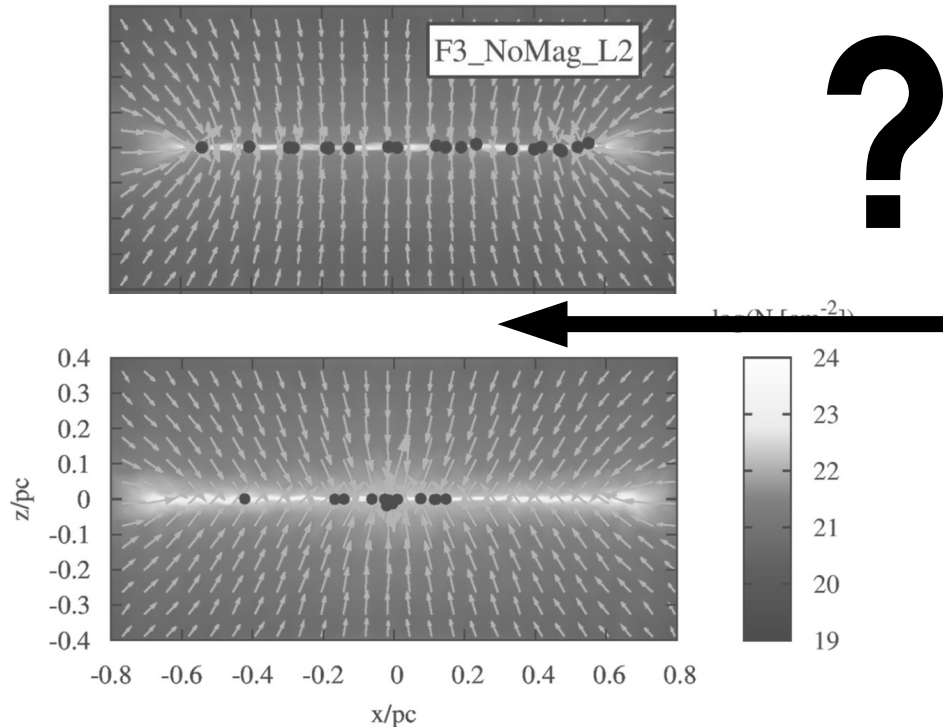


Hoemann et al. 2021

Line-mass influences where cores form first

Large line-mass, $M/L \gtrsim 1 M/L_{\text{crit}}$

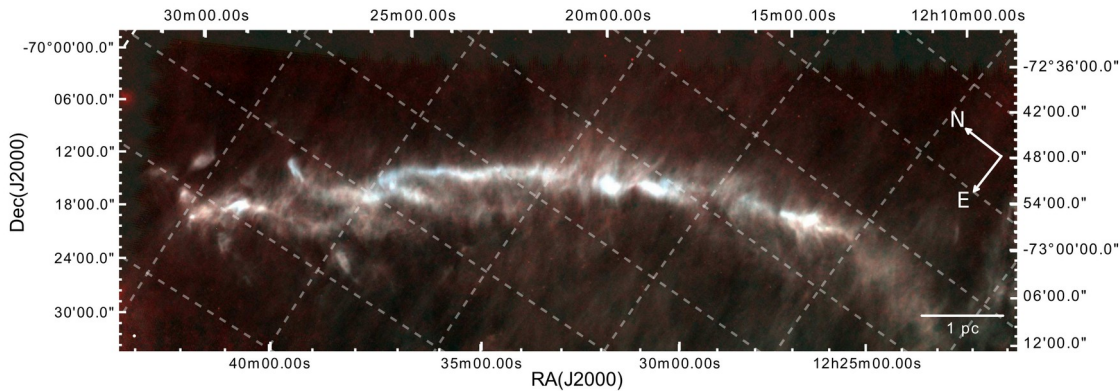
Low line-mass, $M/L \lesssim 1 M/L_{\text{crit}}$



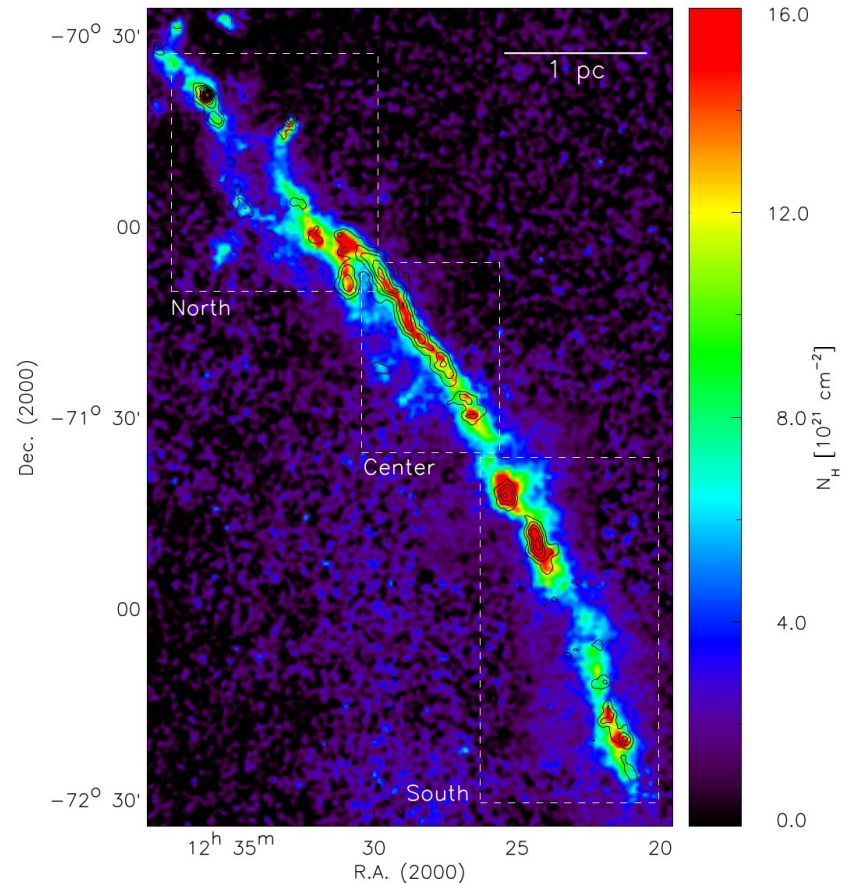
Seifried and Walch 2015

Hoemann et al. 2021

Not many filaments show edge effect

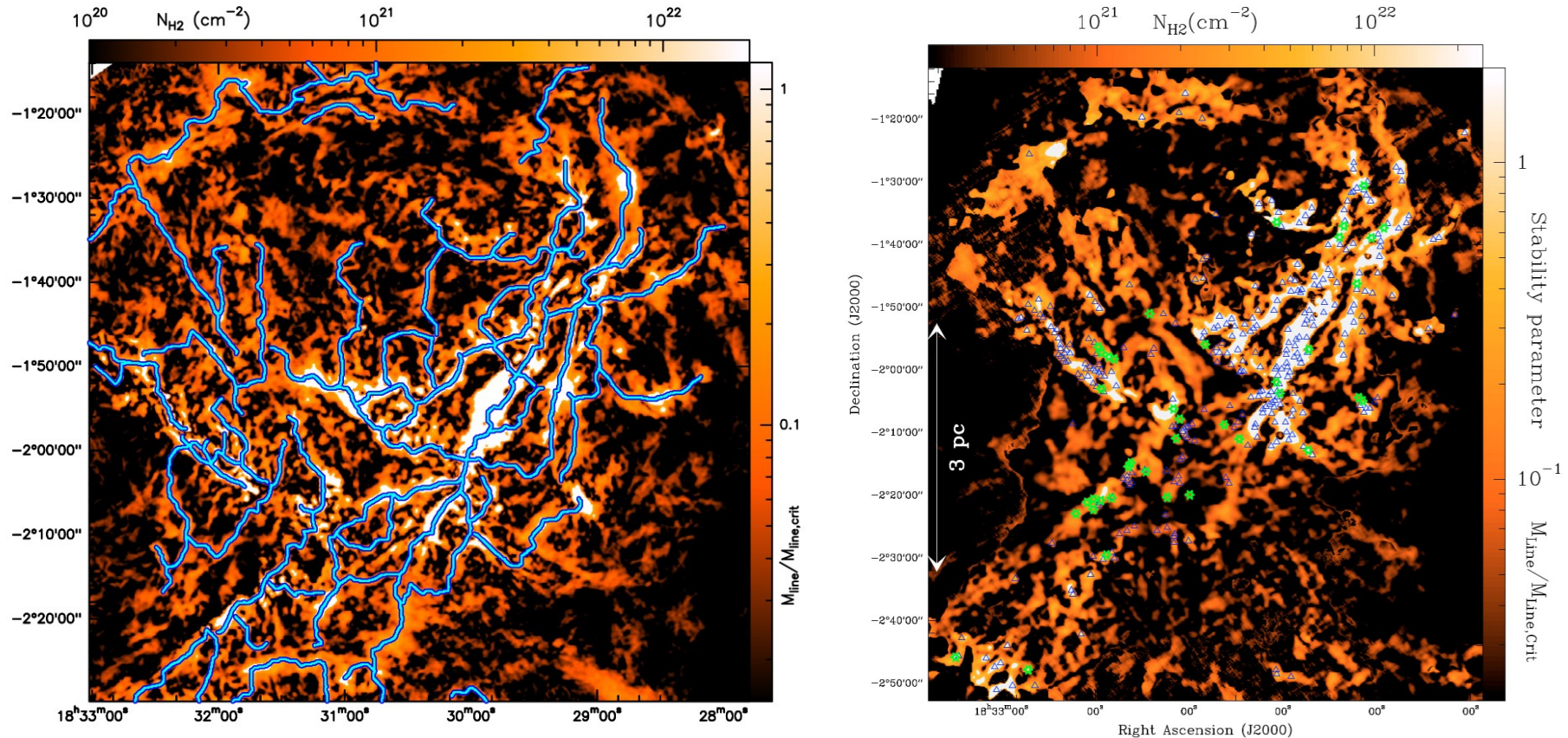


Musca in dust emission, Cox et. al 2016



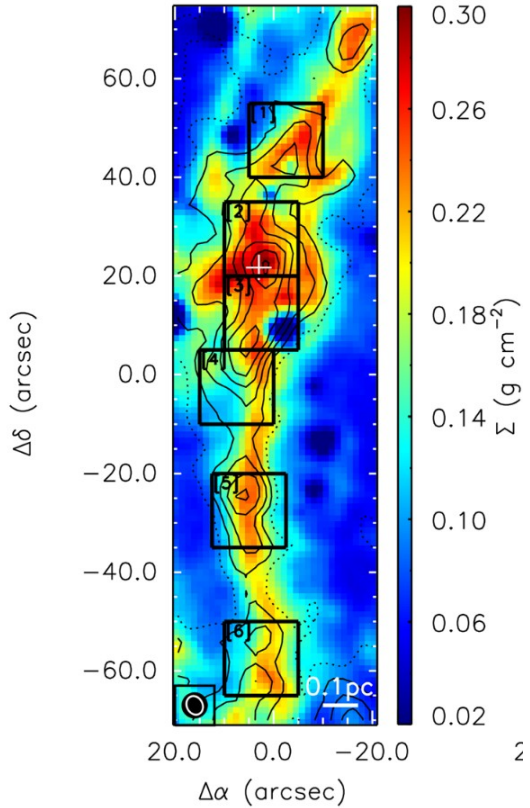
Musca in dust extinction, Kainulainen et. al 2016

Herschel shows distributed core formation

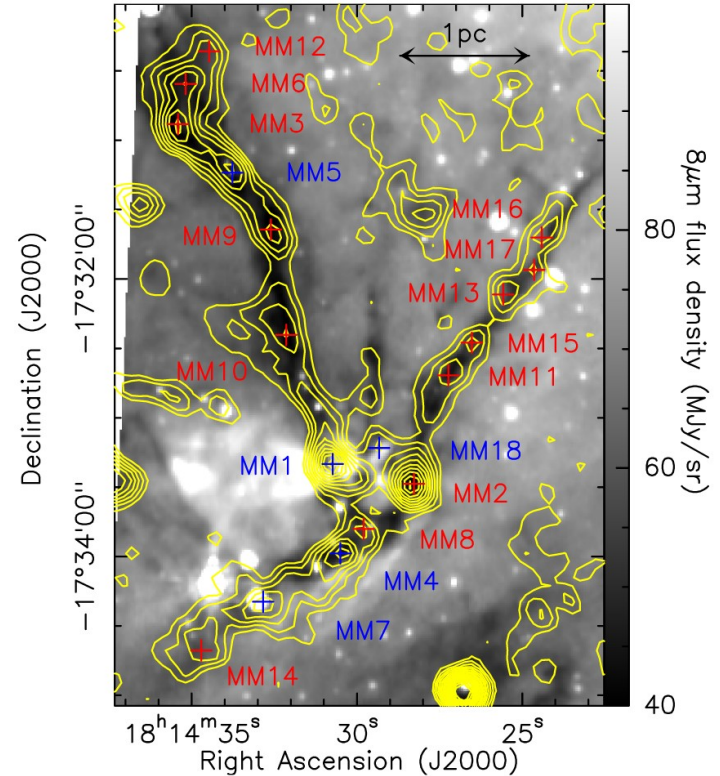


Aquila in dust emission, Könyves et al. 2015 and André et al. 2010

Central collapse common for large line-mass

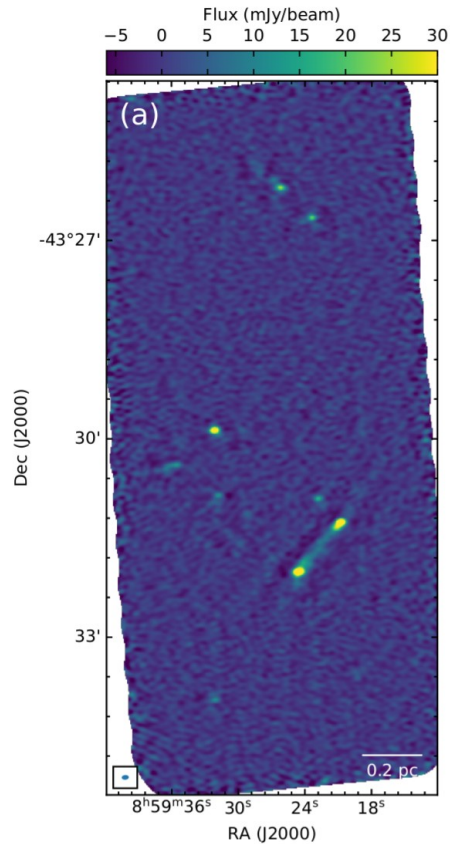


G035.39-00.33 with N_2H^+ contours,
Henshaw et al. 2014

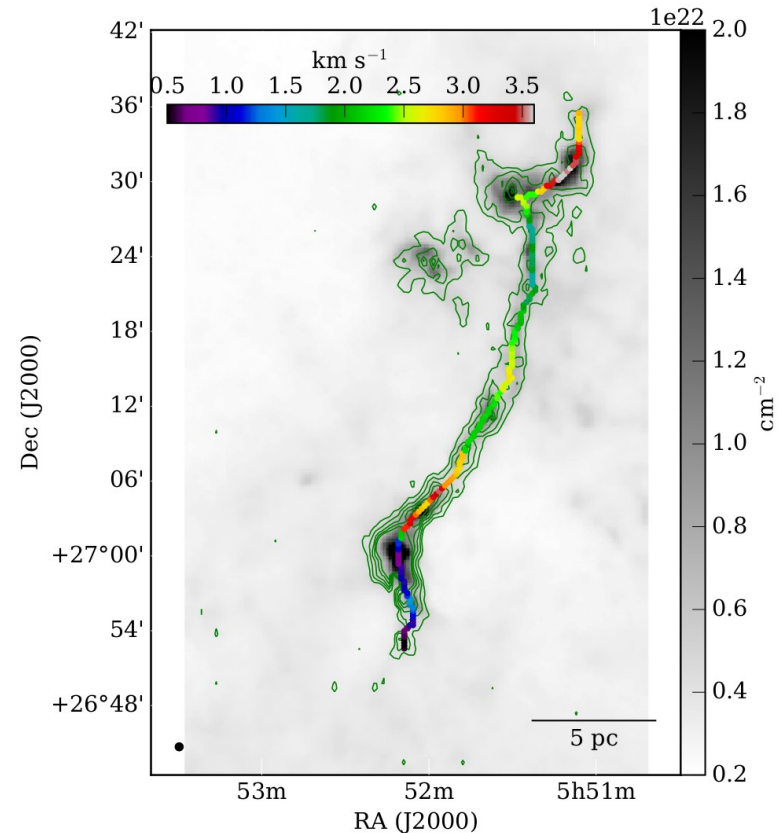


SDC13 with dust continuum contours,
Peretto et al. 2014

Observational evidence of end cores is rare



ALMA observation of Vela C CR1,
Cheng et al. 2021



S242 with ¹³CO contours, Yuan 2020
(see also Dewangan et al. 2017)

Open Questions

- Why don't we observe strong core/star formation at the ends of all filaments?
- How do we get from low to high line-mass filaments without forming end cores?
- How important are tidal forces, magnetic fields and other dynamical processes?

