

Alternative estimation of the dark matter content of dSphs

Ana Laura Serra

in collaboration with Garry Angus & Antonaldo Diaferio

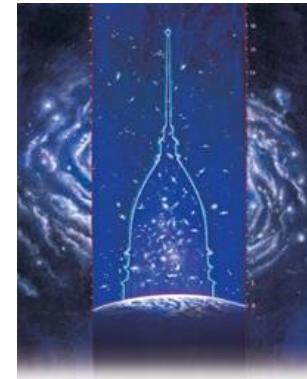
CAUSTIC Group

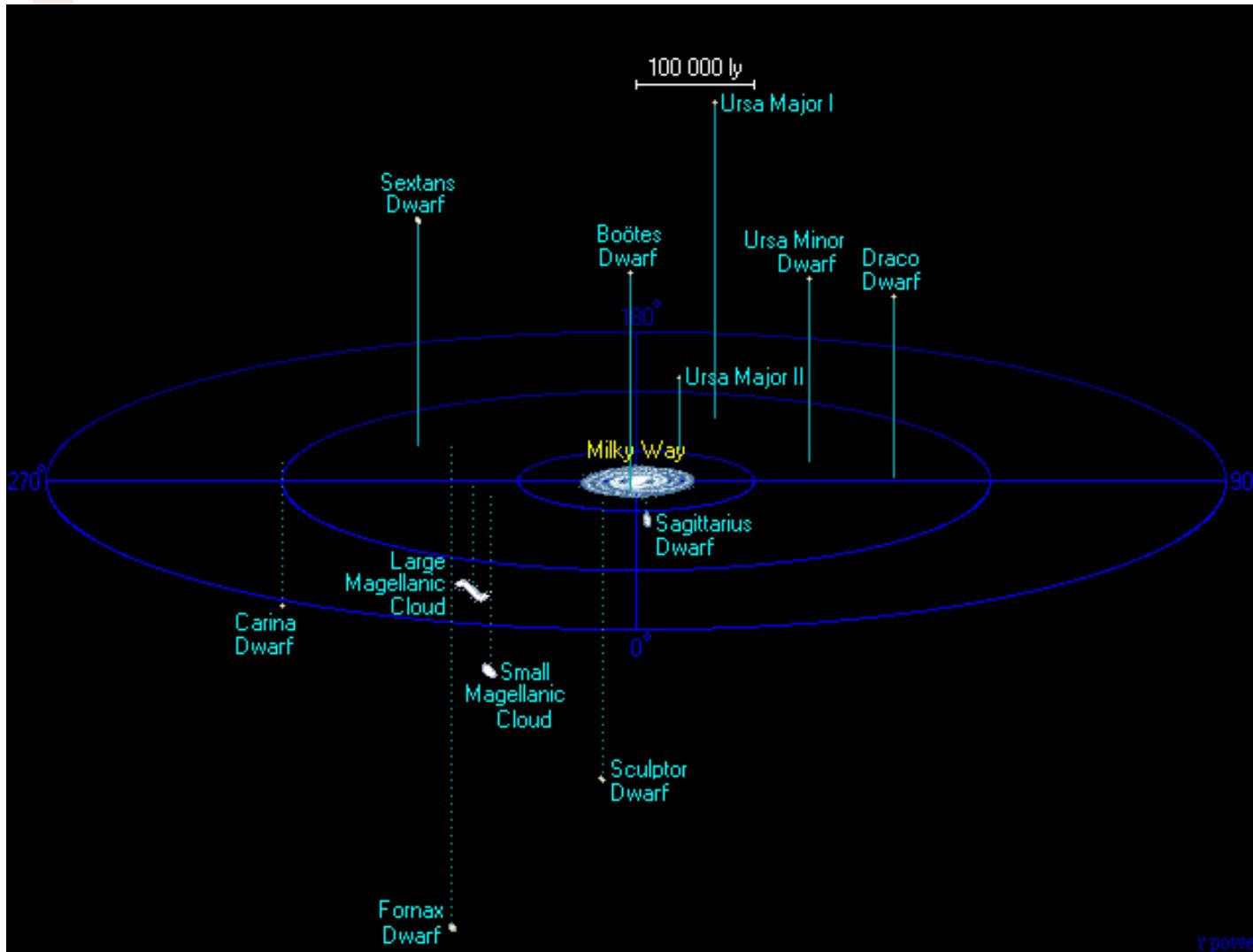
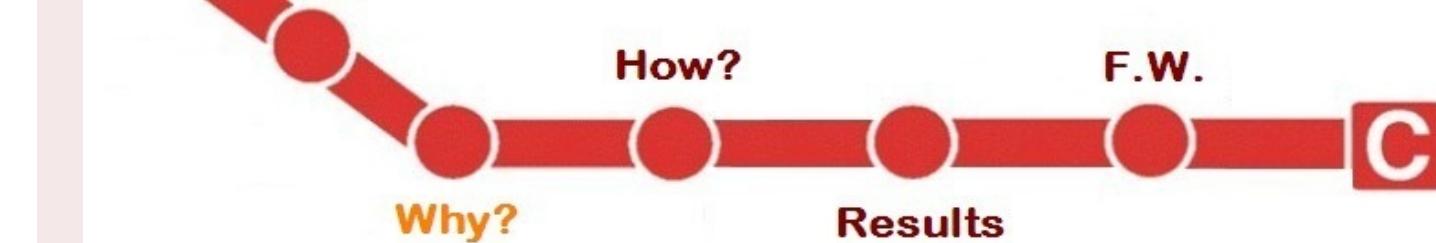
Dipartimento di Fisica Generale “Amedeo Avogadro”

Università di Torino

<http://www.dfg.unito.it/ricerca/caustic/caustic.html>

Bertinoro, May 27, 2009





V_{los} from stars

+

equilibrium

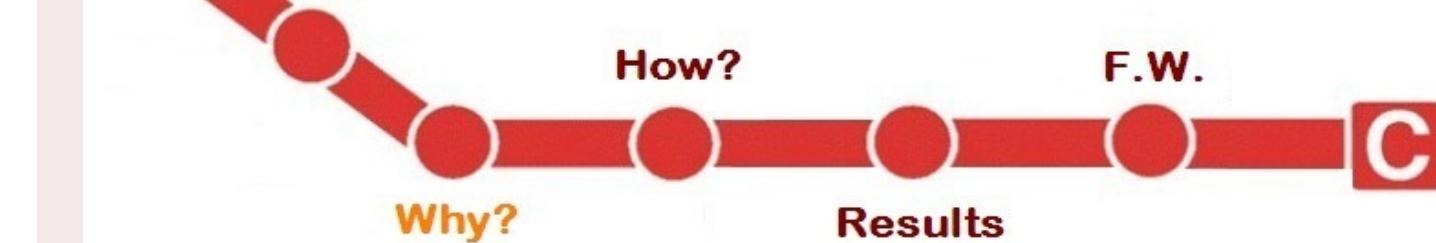
+

spherical

+

Jeans Equation

Acceleration deficit



Acceleration deficit

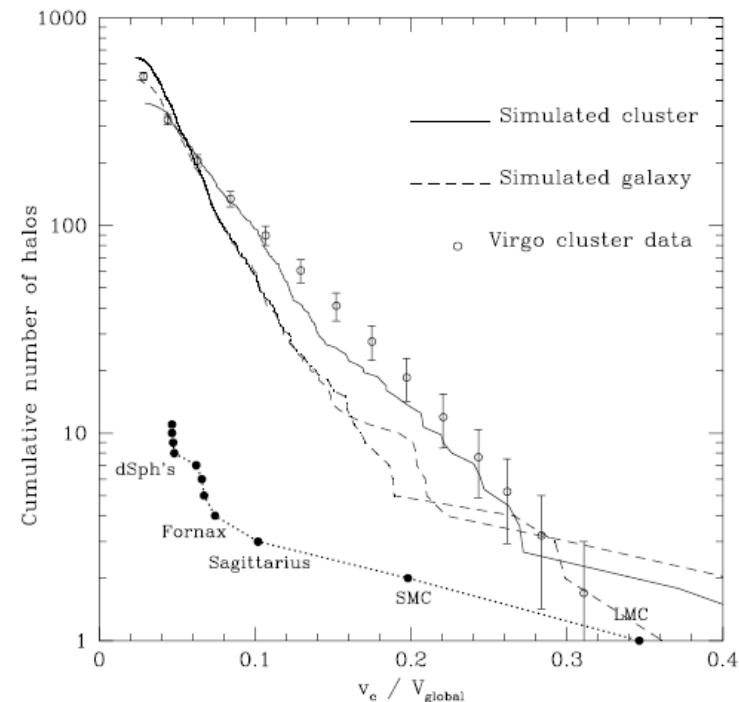
Modified gravity

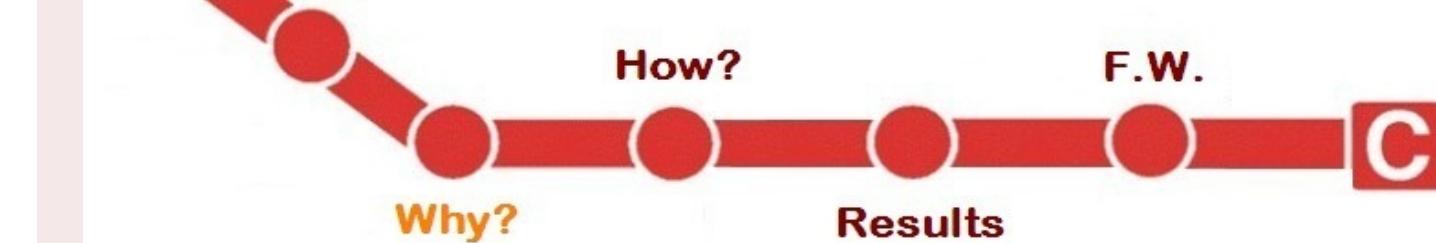
Large M/L

CDM dominated systems

Missing dwarf galaxies problem!

Moore et al., 1999





Acceleration deficit

Modified gravity

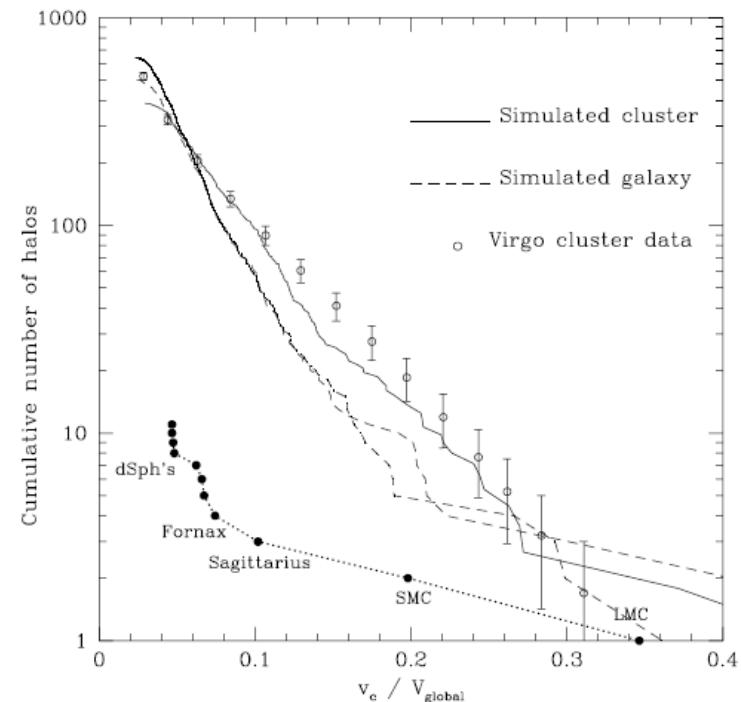
interloper stars

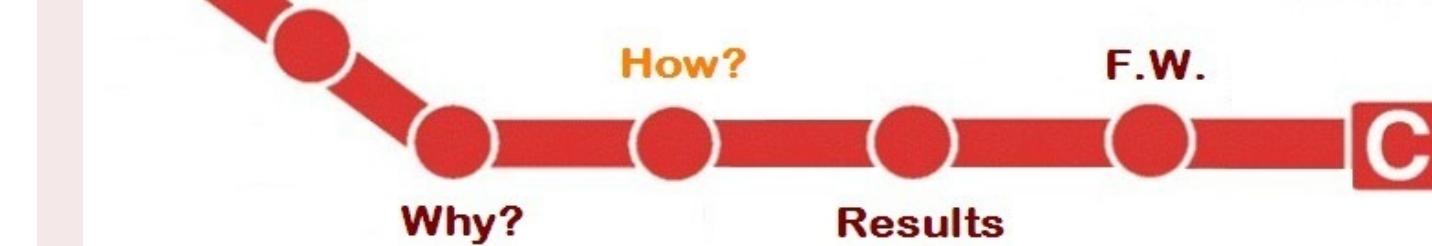
Large M/L

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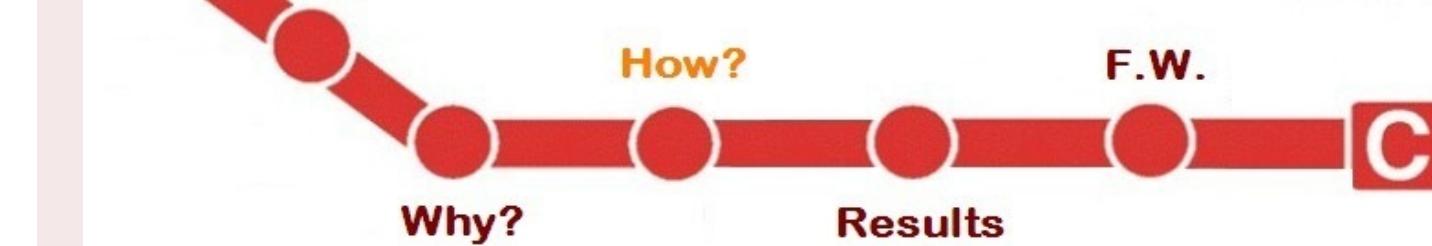
How to identify interloper stars?

Caustic Technique (Diaferio, 1999)

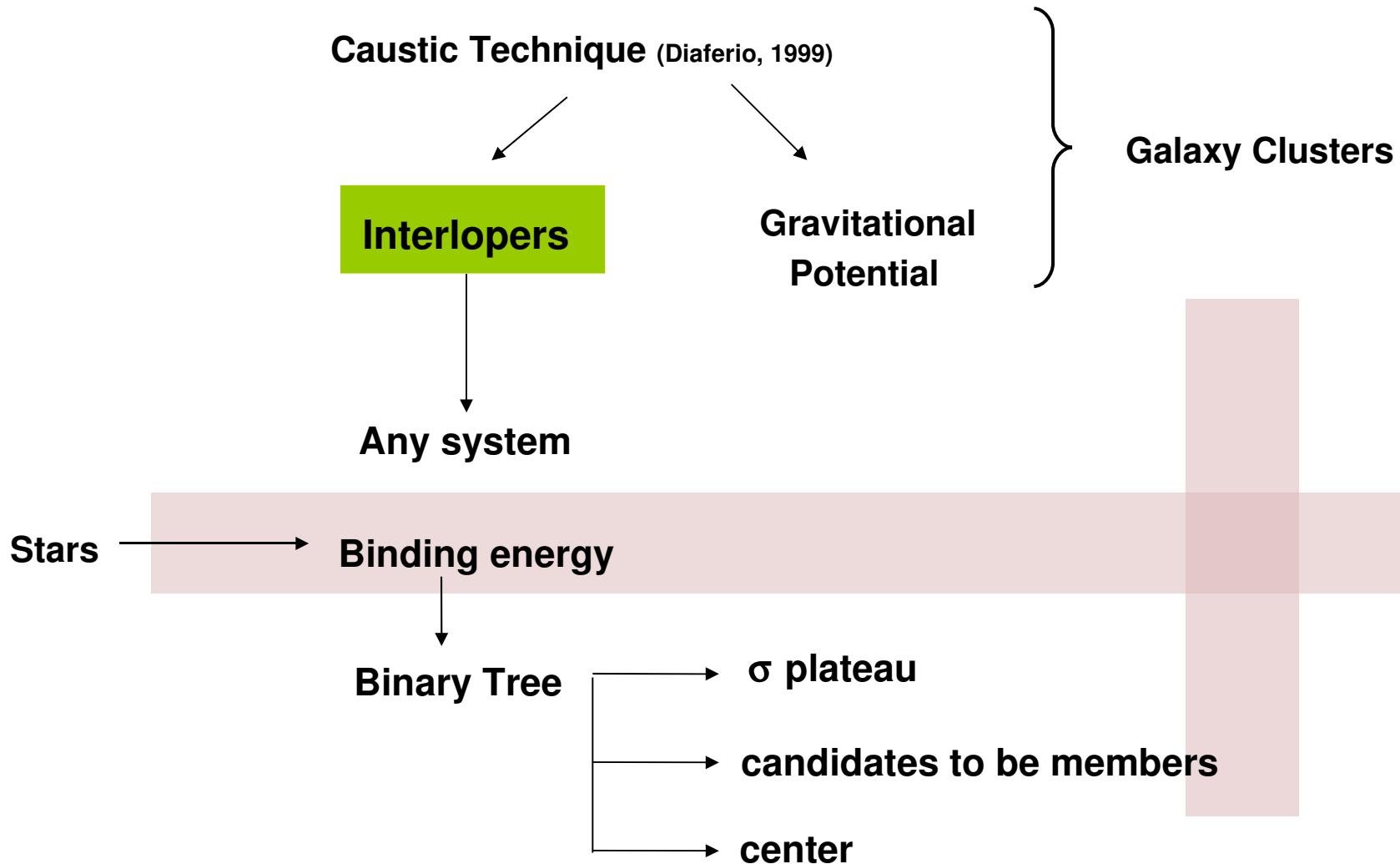
Interlopers

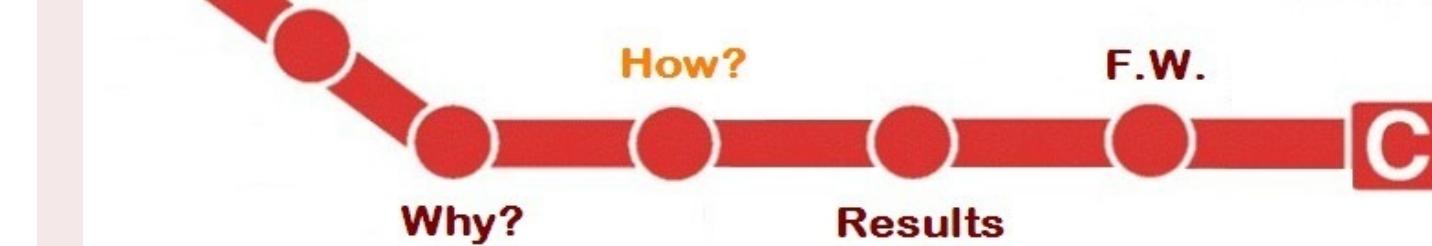
Gravitational
Potential

Galaxy Clusters



How to identify interloper stars?





Binding energy

713 (357) —

672 (308) —

653 (282) —

626 (235) —

596 (139) —

549 (94) —

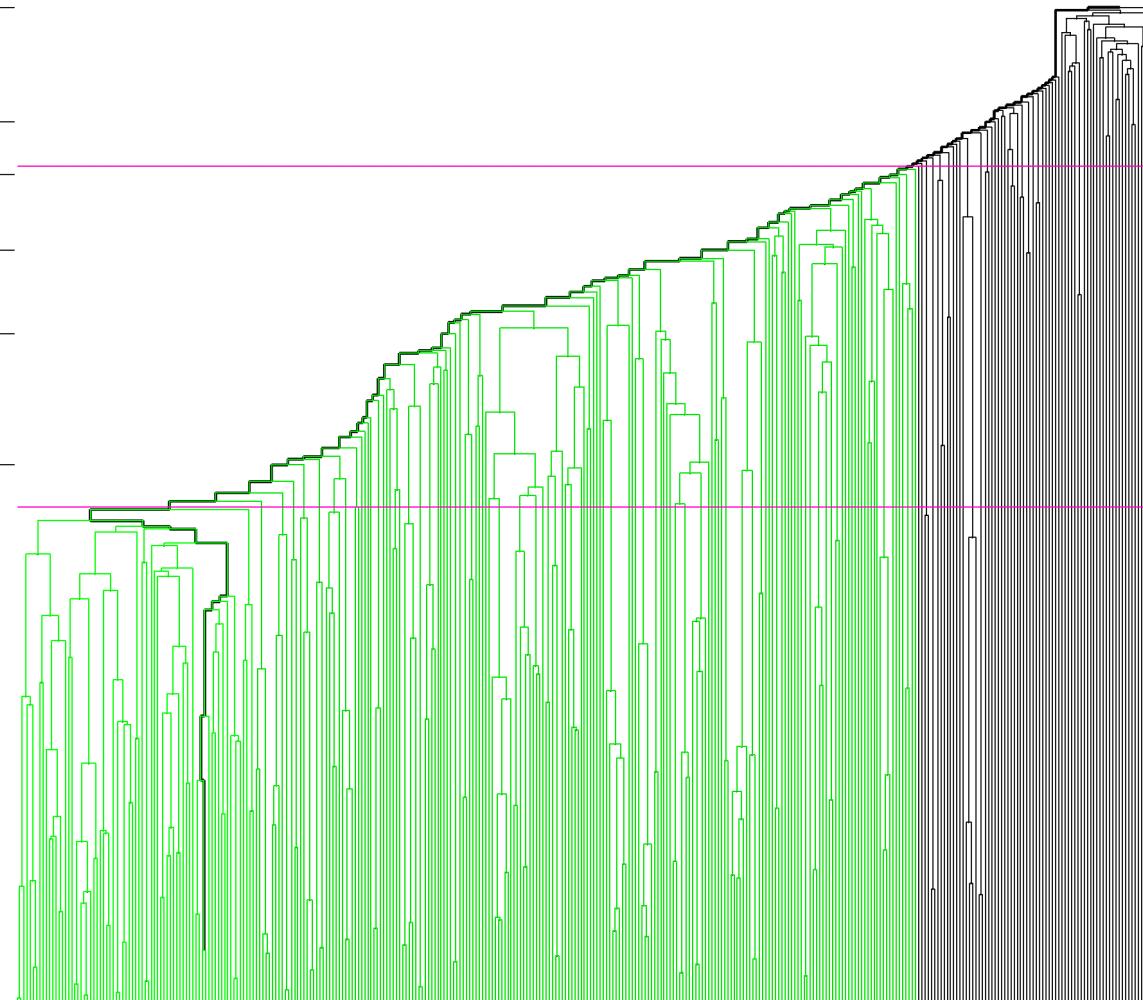
Leo I

Binary Tree

→ **σ plateau**

→ **candidates to
be members**

→ **center**



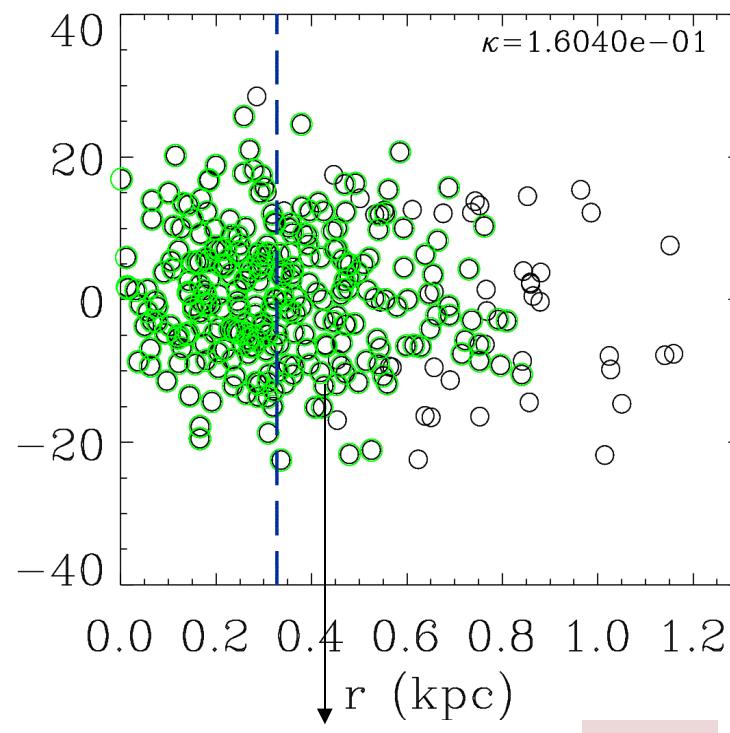
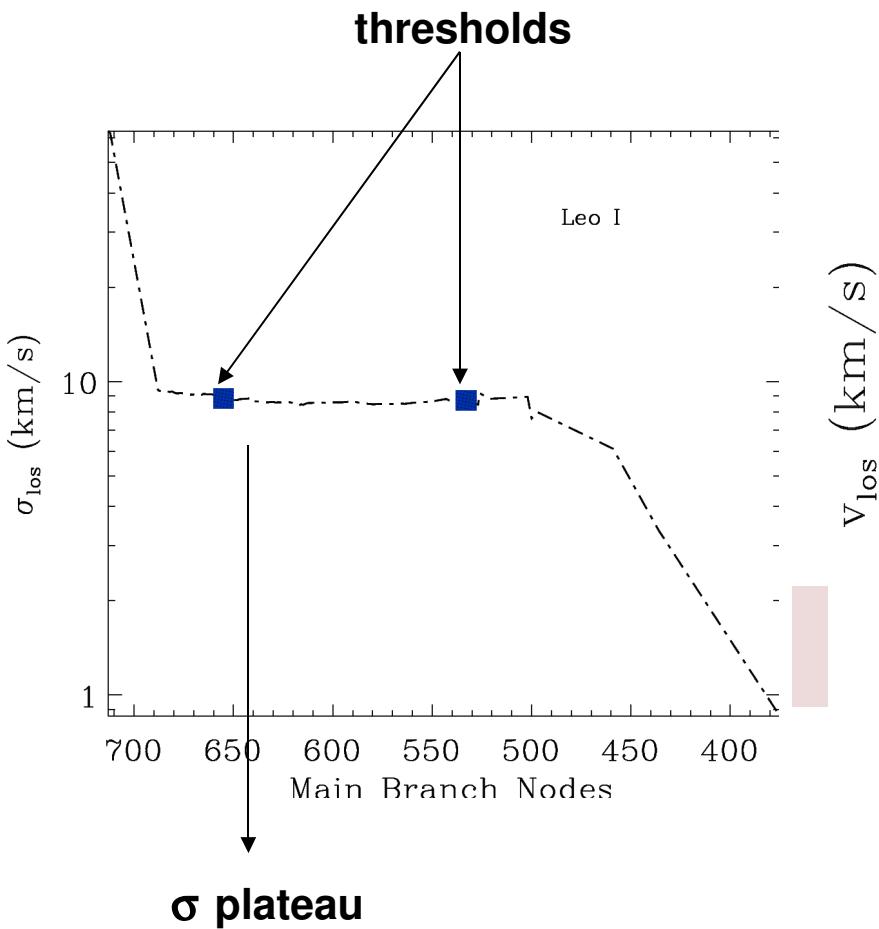
Why?

How?

Results

F.W.

C



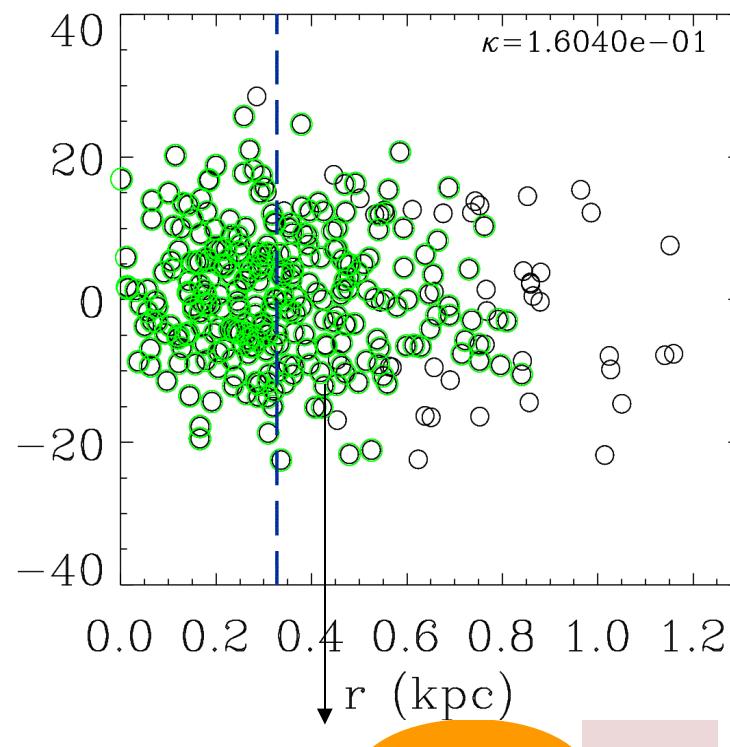
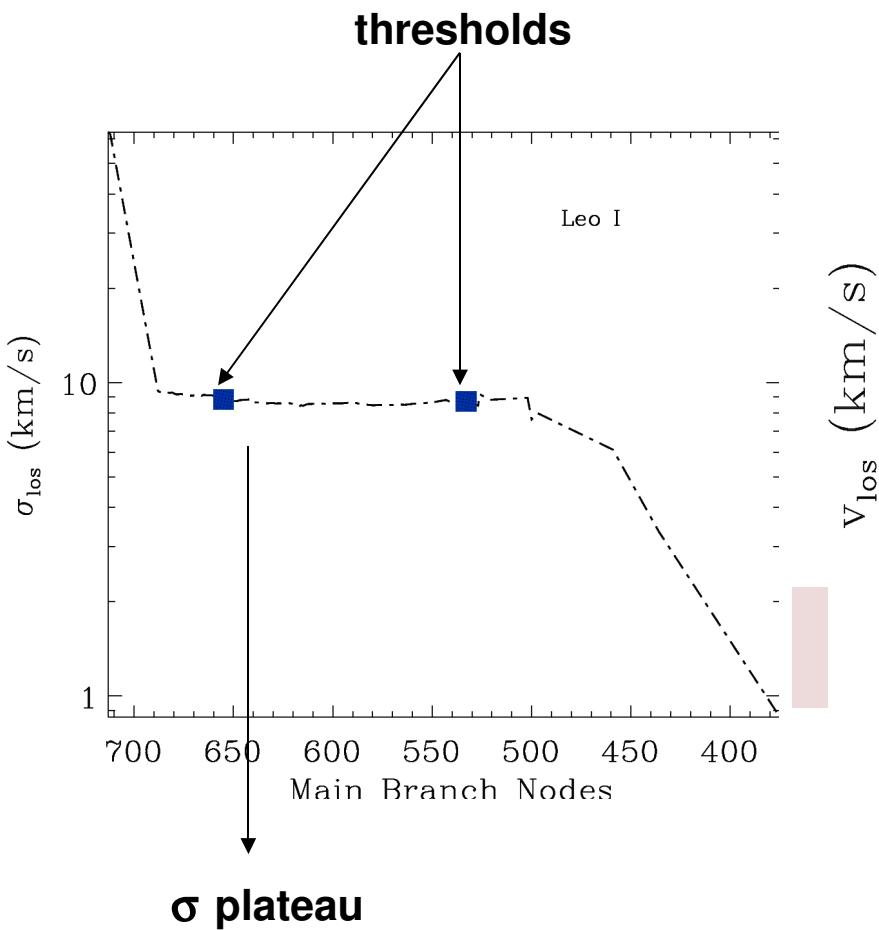
Why?

How?

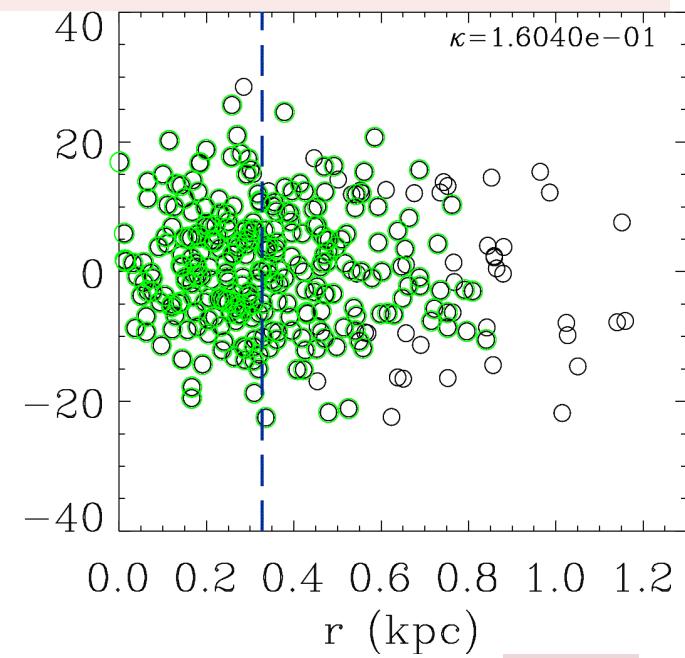
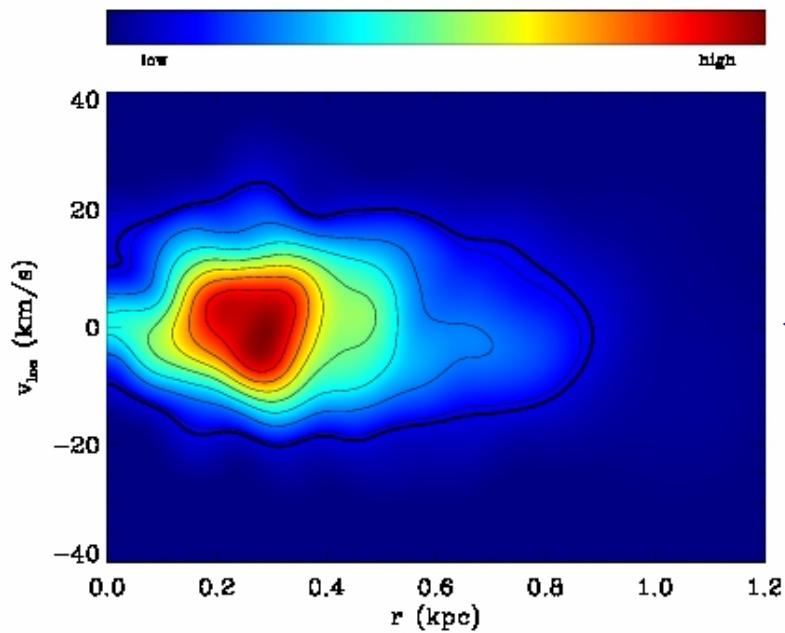
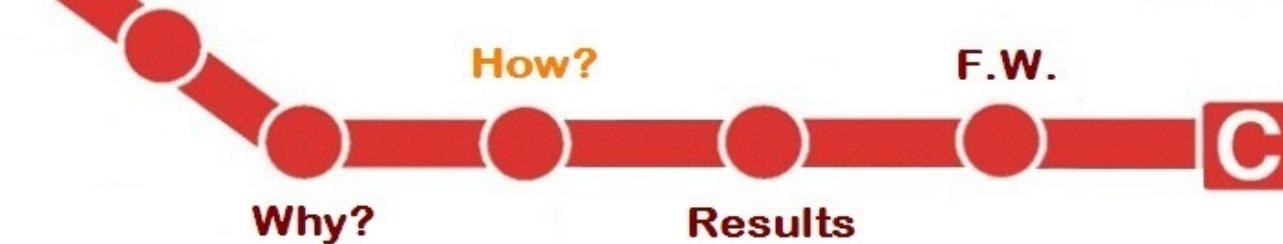
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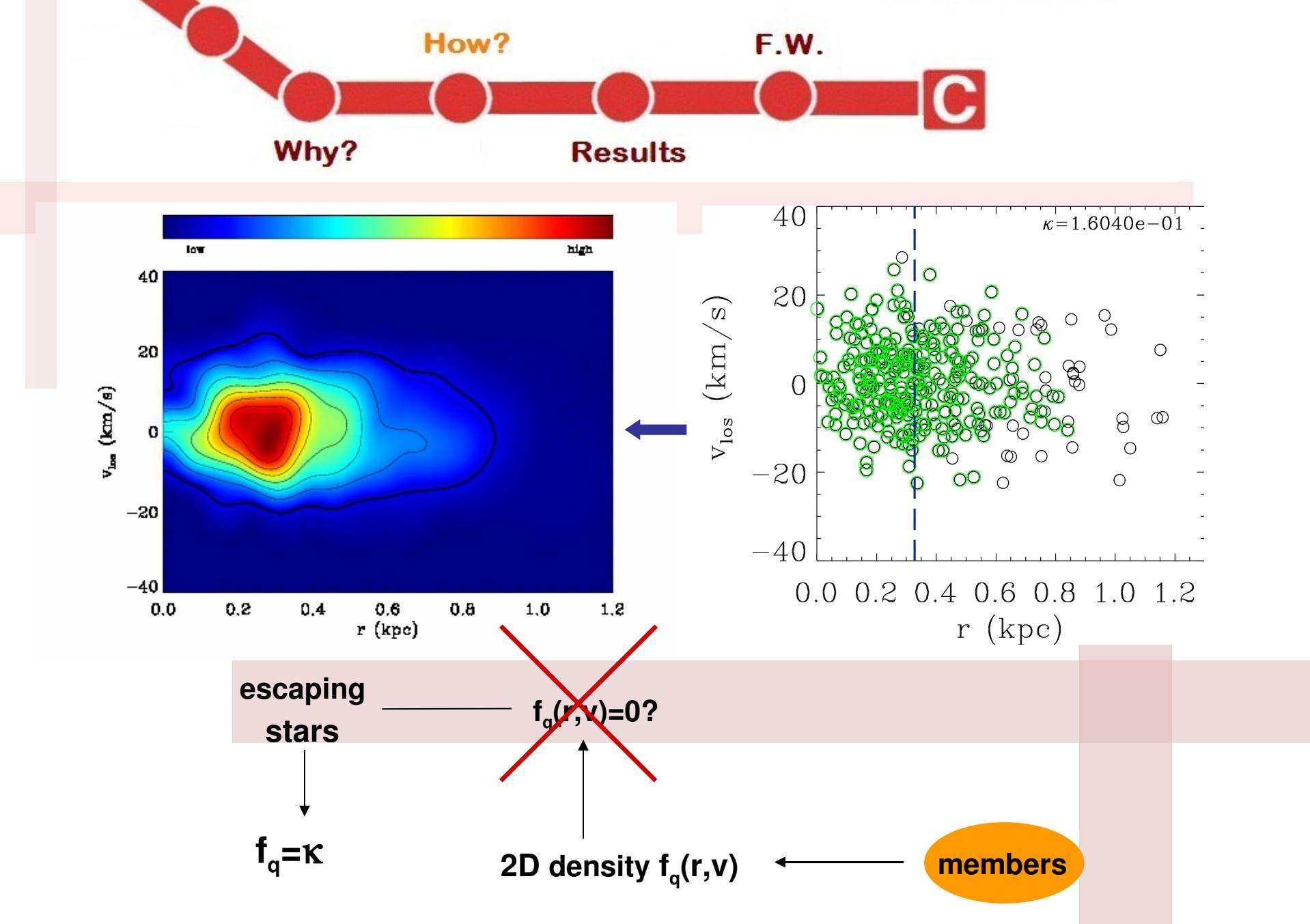
?

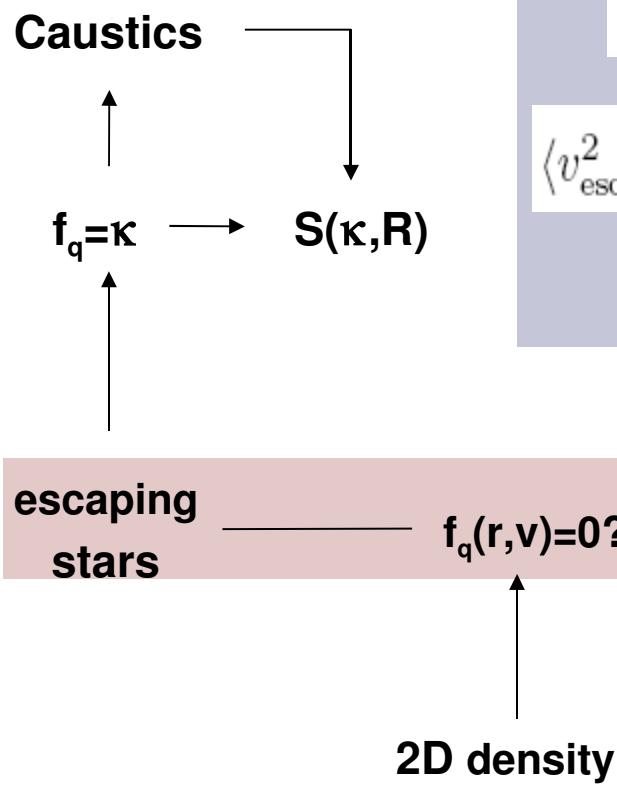
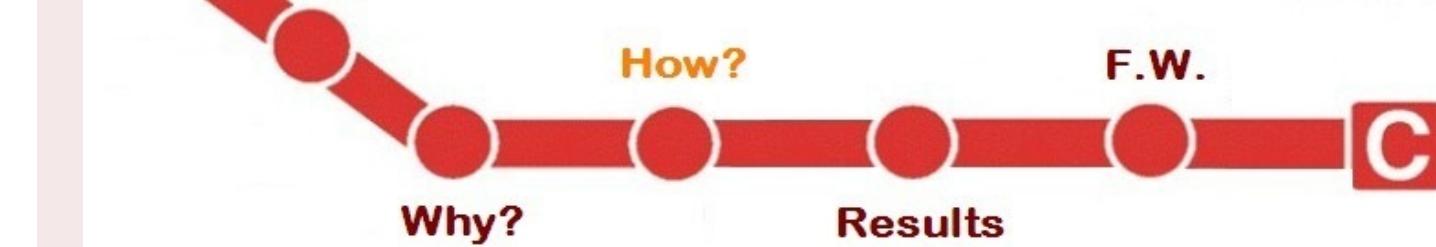


$$f_q(r, v) = 0?$$

2D density $f_q(r, v)$

members





$$S(\kappa, \bar{R}) = |\langle v_{\text{esc}}^2 \rangle_{\kappa, \bar{R}} - 4 \langle v^2 \rangle_{\bar{R}}|^2$$

$$\langle v_{\text{esc}}^2 \rangle_{\kappa, \bar{R}} = \int_0^{\bar{R}} \mathcal{A}^2(R) \varphi(R) dR / \int_0^{\bar{R}} \varphi(R) dR,$$

$$\varphi(R) = \int f_q(R, v) dv$$

How?

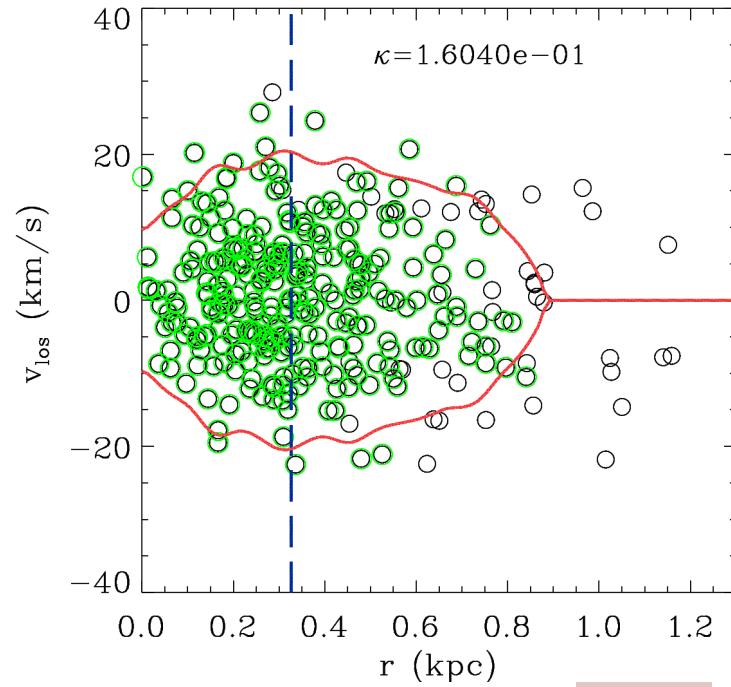
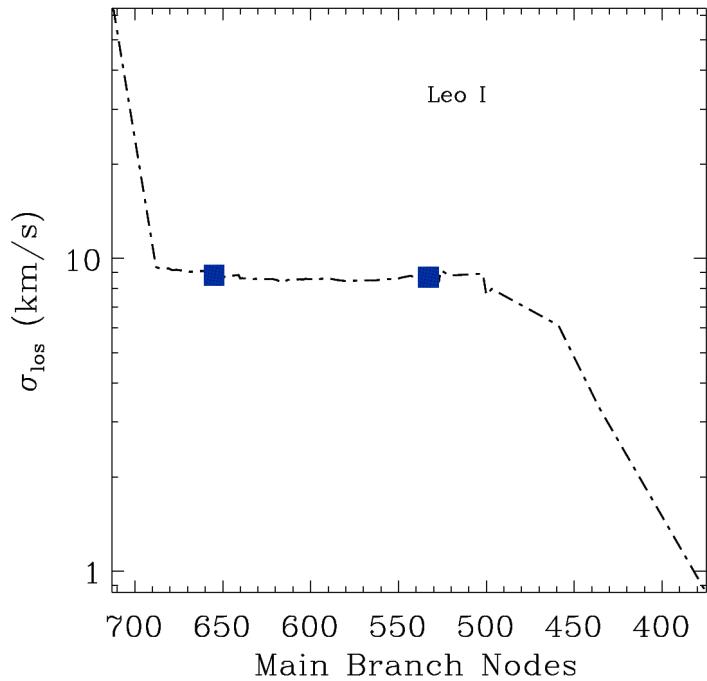
F.W.

Why?

Results

C

Leo I Carina Sextans Sculptor Fornax



How?

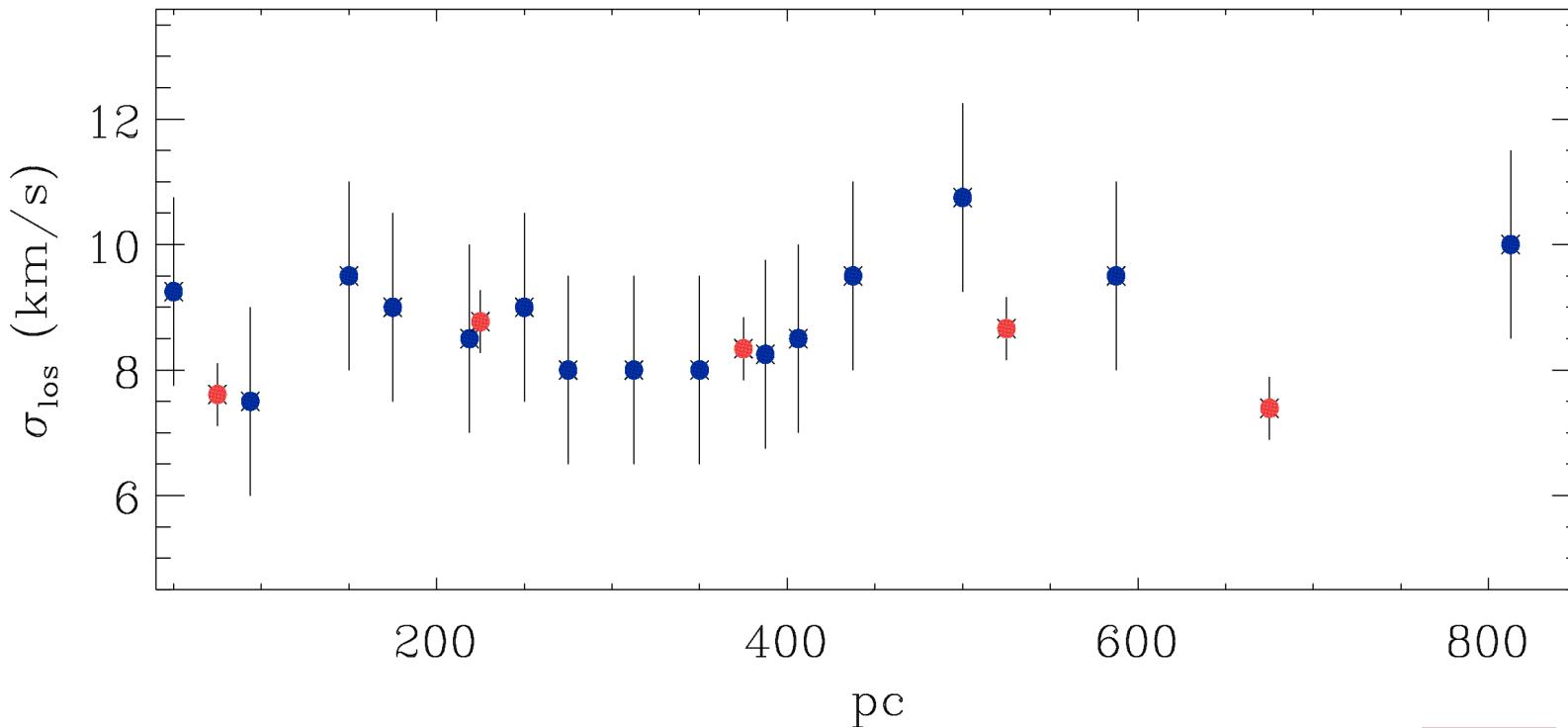
F.W.

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How?

F.W.

Why?

Results

C

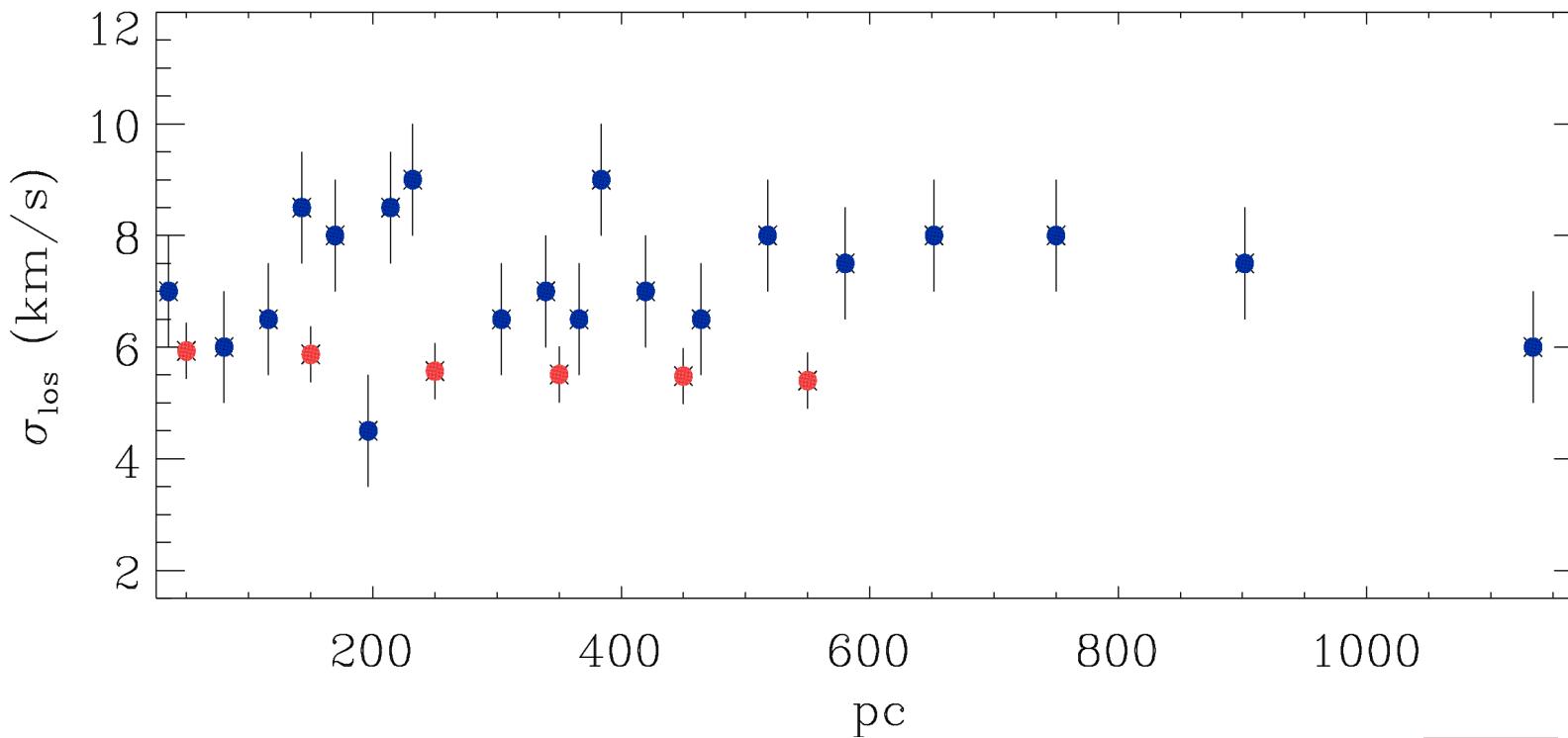
Leo I

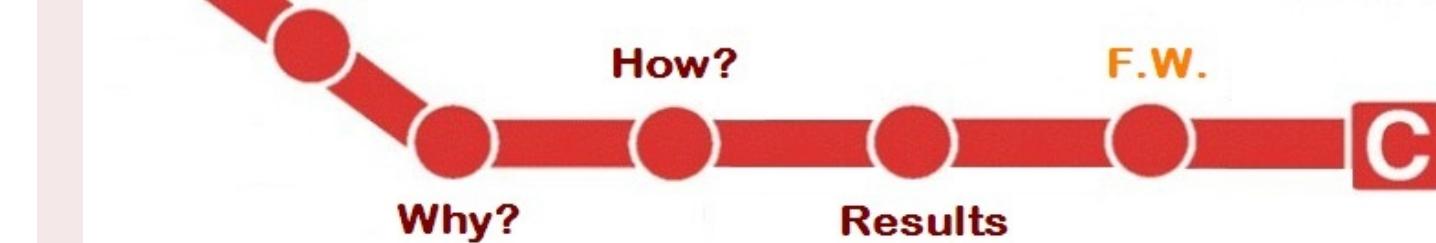
Carina

Sextans

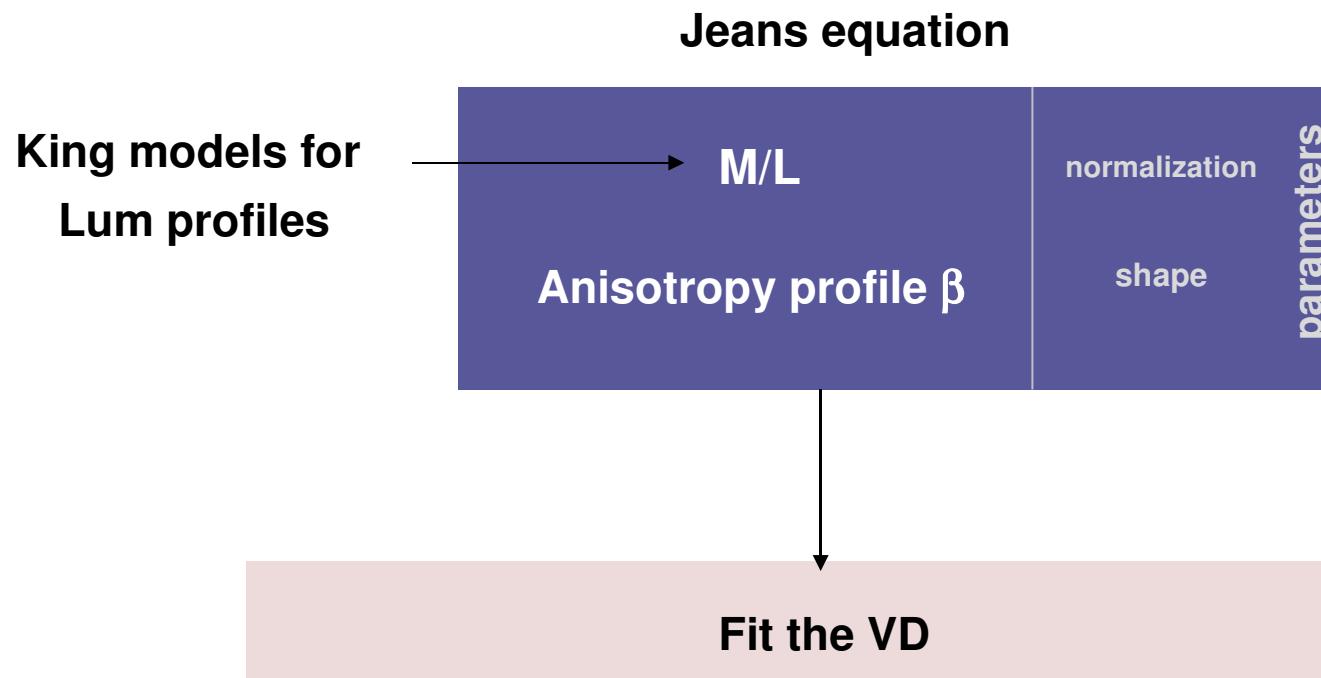
Sculptor

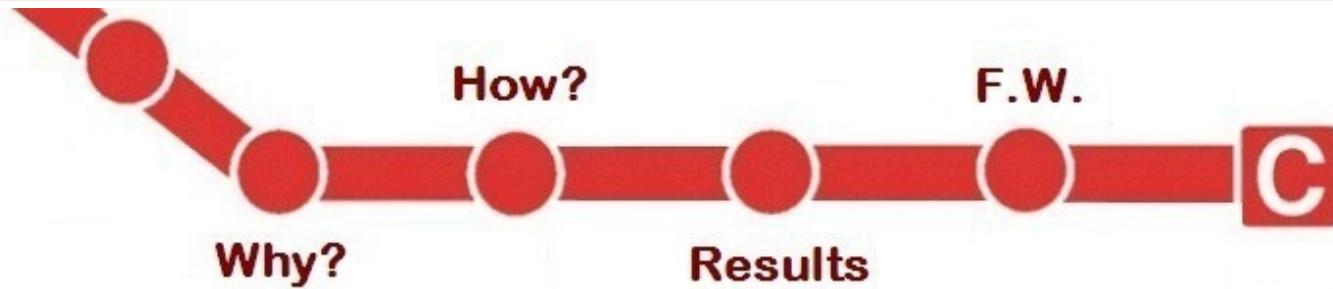
Fornax





Future work





THANK
YOU!!!