



The Divine Ma^ster model

Quintessential / Fluid / Fuzzy Dark Matter (2000-2003)

Galactic halos of fluid dark matter #1

[Alexandre Arbey](#) ([Annecy, LAPTH](#) and [Savoie U.](#)), [Julien Lesgourgues](#) ([CERN](#) and [Annecy, LAPTH](#)), [Pierre Salati](#) ([Annecy, LAPTH](#) and [Savoie U.](#)) (Jan, 2003)

Published in: *Phys.Rev.D* 68 (2003) 023511 • e-Print: [astro-ph/0301533](#) [astro-ph]



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158 citations

A light scalar field at the origin of galaxy rotation curves #2

[J. Lesgourgues](#) ([Annecy, LAPTH](#) and [CERN](#) and [Savoie U.](#)), [A. Arbey](#) ([Annecy, LAPTH](#) and [CERN](#) and [Savoie U.](#)), [P. Salati](#) ([Annecy, LAPTH](#) and [CERN](#) and [Savoie U.](#)) (2002)

Published in: *New Astron.Rev.* 46 (2002) 791-799



DOI



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52 citations

Cosmological constraints on quintessential halos #3

[Alexandre Arbey](#) ([Annecy, LAPTH](#) and [Savoie U.](#)), [Julien Lesgourgues](#) ([CERN](#) and [Annecy, LAPTH](#)), [Pierre Salati](#) ([Annecy, LAPTH](#) and [Savoie U.](#)) (Dec, 2001)

Published in: *Phys.Rev.D* 65 (2002) 083514 • e-Print: [astro-ph/0112324](#) [astro-ph]



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91 citations

Quintessential haloes around galaxies #4

[Alexandre Arbey](#) ([Annecy, LAPTH](#) and [Savoie U.](#)), [Julien Lesgourgues](#) ([Annecy, LAPTH](#)), [Pierre Salati](#) ([Annecy, LAPTH](#) and [Savoie U.](#)) (May, 2001)

Published in: *Phys.Rev.D* 64 (2001) 123528 • e-Print: [astro-ph/0105564](#) [astro-ph]



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140 citations

Ultralight scalars as cosmological dark matter #1

[Lam Hui](#) ([Columbia U.](#)), [Jeremiah P. Ostriker](#) ([Columbia U.](#) and [Princeton U. Observ.](#)), [Scott Tremaine](#) ([Princeton, Inst. Advanced Study](#)), [Edward Witten](#) ([Princeton, Inst. Advanced Study](#)) (Oct 26, 2016)

Published in: *Phys.Rev.D* 95 (2017) 4, 043541 • e-Print: [1610.08297](#) [astro-ph.CO]



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853 citations

Hui, Ostriker, Tremaine, Witten 2016

Quintessential haloes around galaxies

#4

Alexandre Arbey (Annecy, LAPTH and Savoie U.), Julien Lesgourgues (Annecy, LAPTH), Pierre Salati (Annecy, LAPTH and Savoie U.) (May, 2001)

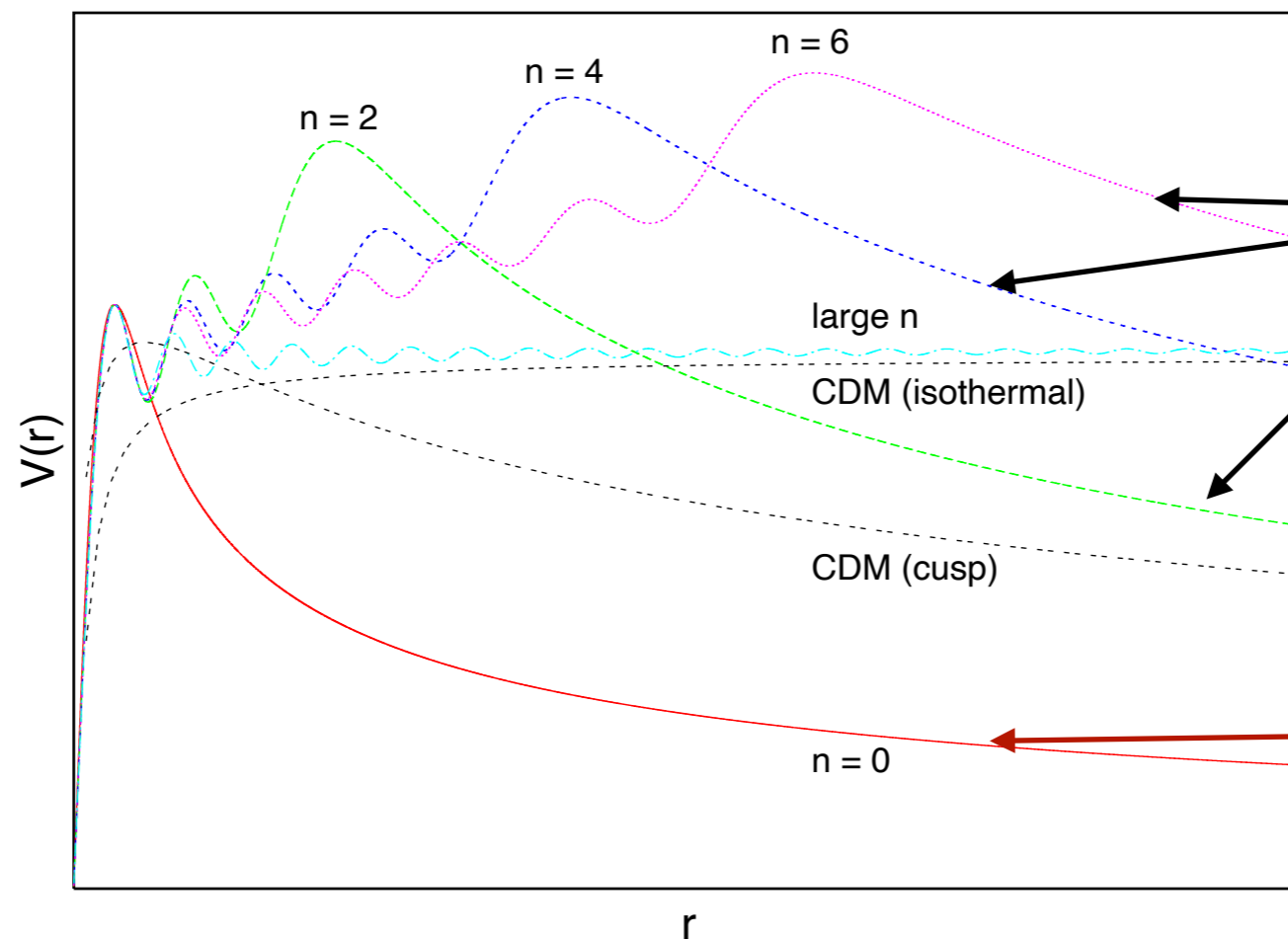
Published in: *Phys.Rev.D* 64 (2001) 123528 • e-Print: [astro-ph/0105564](https://arxiv.org/abs/astro-ph/0105564) [astro-ph]

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 140 citations

$$\mathcal{S} = \int \sqrt{-g} d^4x \mathcal{L} \{ \Phi, \partial_\mu \Phi \} = \int \sqrt{-g} d^4x \{ g^{\mu\nu} \partial_\mu \Phi^\dagger \partial_\nu \Phi - U(\Phi) \} \quad \text{with} \quad U = m^2 \Phi^\dagger \Phi$$

Galaxy rotation curve



excited states

quintessential matter in fundamental state

Cosmological constraints on quintessential halos

#3

Alexandre Arbey (Annecy, LAPTH and Savoie U.), Julien Lesgourgues (CERN and Annecy, LAPTH), Pierre Salati (Annecy, LAPTH and Savoie U.) (Dec, 2001)

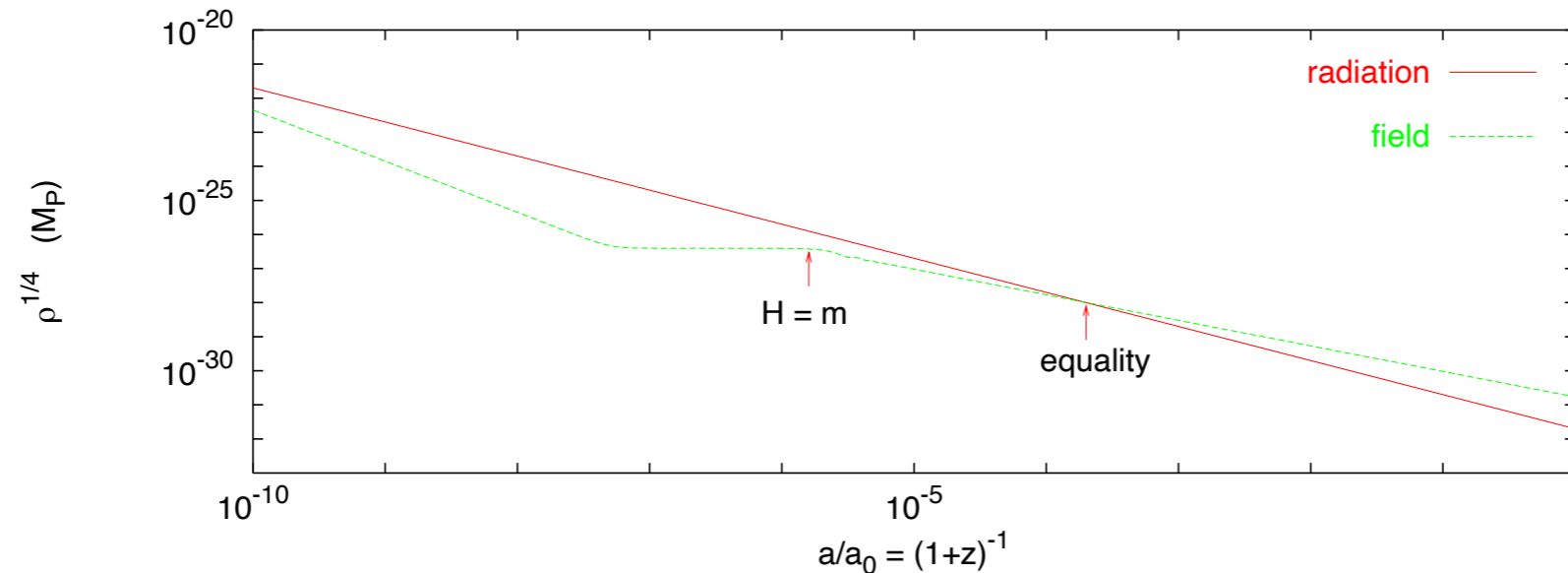
Published in: *Phys.Rev.D* 65 (2002) 083514 • e-Print: [astro-ph/0112324](https://arxiv.org/abs/astro-ph/0112324) [astro-ph]

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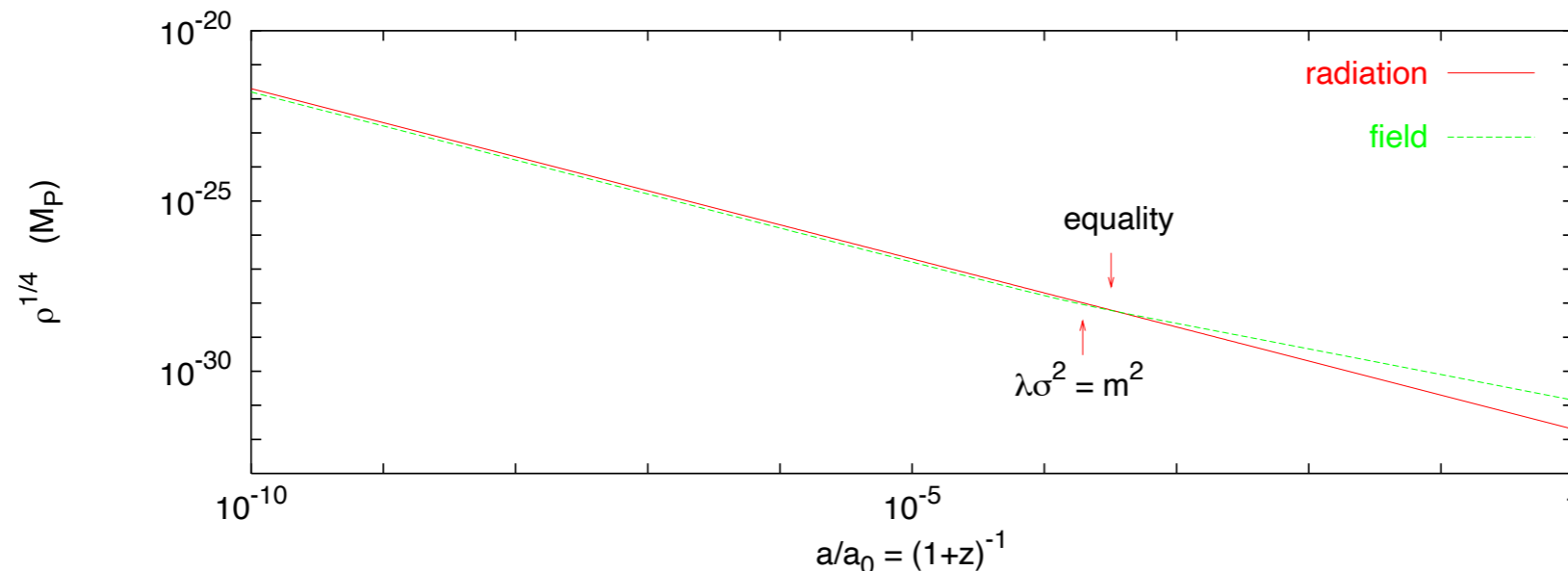
 91 citations

$$\mathcal{L} = g^{\mu\nu} \partial_\mu \phi^\dagger \partial_\nu \phi - V(\phi) \quad V = m^2 \phi^\dagger \phi + \lambda \{\phi^\dagger \phi\}^2$$

Cosmological evolution of quintessential DM background, for $\lambda = 0$ and $m \sim 10^{-23}$ eV



Same for $m \sim \lambda^{1/4}$ eV derived from rotation curves



Galactic halos of fluid dark matter

#1

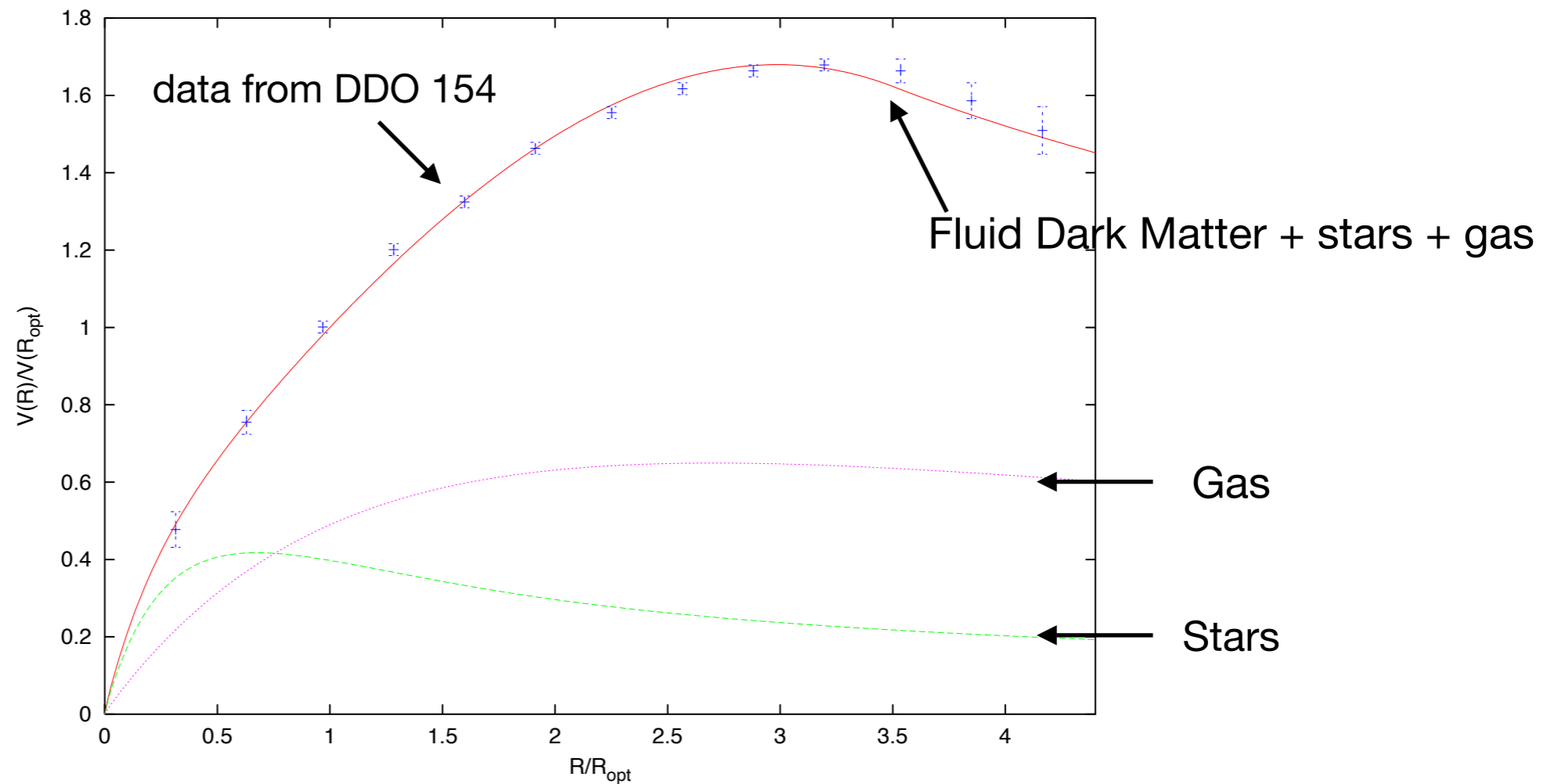
Alexandre Arbey (Annecy, LAPTH and Savoie U.), Julien Lesgourgues (CERN and Annecy, LAPTH), Pierre Salati (Annecy, LAPTH and Savoie U.) (Jan, 2003)

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 158 citations

$$\mathcal{L} = g^{\mu\nu} \partial_\mu \phi^\dagger \partial_\nu \phi - V(\phi) \quad , \quad V(\phi) = m^2 \phi^\dagger \phi + \lambda \{\phi^\dagger \phi\}^2$$



Galaxy rotation curve