Jean-Baptiste Fouvry

Nationality: French
Date of Birth: March 16th, 1991
Institut d'Astrophysique de Paris
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EDUCATION & TRAINING

2025 – present	Part-time associate professor of physics **Ecole Polytechnique**
2022	**Habilitation à diriger les recherches**, Sorbonne Université *Stellar Dynamics in Galactic Nuclei*
2019 – present	**CNRS**, Chargé de recherche classe normale **Institut d'Astrophysique de Paris**
2016 – 2019	**NASA Hubble Fellow** Member, **Institute for Advanced Study**, Princeton
2013 – 2016	Ph.D. at the **Institut d'Astrophysique de Paris** *Secular evolution of self-gravitating systems over cosmic age* Advisors: Christophe Pichon (IAP, Paris) and James Binney (Oxford)
2012 – 2013	First-year student in the **Corps des Mines** Attached to the French Ministry of Economy, Industry and Employment
2009 – 2012	Master at the **Ecole Polytechnique** French national engineering school, 4-years master program

AWARDS

2017	Prize Aguirre-Basualdo, *Chancellerie des Universités de Paris*
2017	Mention Prize Daniel Guinier, *Société Française de Physique*
2017	Ph.D. Prize 2017, *Société Française d'Astronomie & d'Astrophysique*
2017	Outstanding Thesis Award, *Springer Verlag*
2007	Shared First Prize, *Concours Général de Physique*

GRANTS

2025	Grant *ANR*, *BEYOND-BL* – PI – 460,000€
2024	Grant *PNCG*, IAP – PI – 3,000€
2020 – 2023	Grant *ANR Tremplin*, IAP – PI – 120,000€
2020 – 2021	Grant *Initiative Physique des Infinis*, Sorbonne Université – PI – 60,000€
2020	Grant *PNCG*, IAP – PI – 3,000€
2016	NASA Hubble Fellowship – PI – $250,000
2016	Grant *PNCG*, IAP – PI – 3,000€
2015 – 2016	Grant *Défi Inphyniti CNRS*, IAP – Toulouse – PI – 2×5,000€
2015	Grant *Institut Lagrange de Paris* – PI – 5,000€
2014	Grant *GREAT program*, Oxford – PI – 5,000€
2014	Grant *Oxford-CNRS Collaboration Scheme*, Oxford – PI – 5,000€

RESPONSIBILITIES

2025 – 2026	Jury member for the admission competition of the Astronomy & Astrophysics Doctoral School of Ile-de-France
2024	"Interconnections between the Physics of Plasmas and Self-gravitating Systems" KITP program; main organizer
2023 – 2024	Weekly Astrophysics Colloquium IAP; main organizer
2023	Univ. Edinburgh Workshop"Secular evolution of self-gravitating systems"; main organizer
2019 – 2021	"Kinetic Theory of Self-Gravitating Systems"; M2 teaching in Oxford
11/2017	IAS Workshop "Stellar Dynamics in Galactic Nuclei"; main organizer
2017 – 2018	Weekly Astrophysics Colloquium, IAS - Princeton; main organizer
05/2016	IAP Workshop "Secular Evolution of Self-Gravitating Systems over Cosmic Age"; main organizer
2015 – present	Referee: MNRAS, ApJ, A&A, New. Astron., JPP, Phys. Rev. D, Phys. Rev. E, Phys. Rev. Lett., Universe, J. Stat. Phys., Entropy, EPJP

RESEARCH SUPERVISION

Postdocs

2022 – 2024	B. Deme, *Dynamics of quasi-Keplerian systems*
2021 – 2022	M. Petersen, *Linear response of stellar systems*

PhD students

2026 – (2030)	S. Alexanian, *The role of resonances in the long-term relaxation of self-gravitating systems*
2025 – (2029)	T. Bizien, *Generalising the Balescu–Lenard equation in self-gravitating systems*
2024 – (2027)	A. El Rhirhayi (with J. Barré), *Dynamics of self-gravitating systems close to marginal stability*
2023 – 2026	S. Flores, *Stellar dynamics in galactic nuclei*
2021 – 2024	M. Roule (with C. Pichon), *Kinetic theory of self-gravitating systems*
2020 – 2023	K. Tep (with C. Pichon), *Relaxation of anisotropic stellar clusters*
2017 – 2020	S. Rozier (with C. Pichon), *Linear stability of rotating stellar clusters*

MSc students

2026	S. Alexanian, *Resonance broadening in self-gravitating systems*
2025	T. Bizien, *Non-linear response theory in self-gravitating systems*
2024	A. El Rhirhayi, *Balescu–Lenard equation close to marginal stability*
2023	S. Flores, *Direct interaction approximation in galactic nuclei*
2022	P. Bartoli, *Resonant relaxation in harmonic cores*
2021	N. Magnan, *Thermodynamics of orbital orientations in galactic nuclei*
2021	M. Roule, *Long-term relaxation of* $1D$ *self-gravitating systems*
2020	K. Tep, *Scalar resonant relaxation around SgrA**
2020	J. Giral Martìnez, *Vector resonant relaxation and neighbor separation*
2017	C. Hamilton, *Resonant relaxation of globular clusters*

BSc students

2025	C. Kangaye, *Resonance broadening in self-gravitating systems*
2015	L. Monk, *Spontaneous thicknening of galactic discs*

PUBLICATIONS

[49] *From Landau Equation and Large Deviations to Efficient Simulations of Dynamical Fluctuations*,
El Rhirhayi, A., **Fouvry, J.-B.**, Barré, J., APS, submitted

[48] *Very long-term relaxation of harmonic 1D self-gravitating systems*,
Tep, K., **Fouvry, J.-B.**, Pichon, C., A&A, in press

[47] *Vector Resonant Relaxation and Statistical Closure Theory. II. One-loop Closure*,
Flores, S., **Fouvry, J.-B.**, Phys. Rev. E, 2025, 113, 064127

[46] *Thermodynamic Blocking in Self-Gravitating Systems*,
Deme, Barnabás, **Fouvry, J.-B.**, 2025, Universe, 11, 419

[45] *Kinetic theory of two-dimensional point vortices at order* $1/N$ *and* $1/N^2$,
Fouvry, J.-B., Chavanis, P.-H., Phys. Rev. E, 2025, 112, 064113

[44] *The long-term evolution of razor-thin galactic discs: Balescu–Lenard prediction and perspectives*,
Roule, M., **Fouvry, J.-B.**, Pichon, C., Chavanis, P.-H., 2025, A&A, 699, A140

[43] *Vector resonant relaxation and statistical closure theory: Direct interaction approximation*,
Flores, S., **Fouvry, J.-B.**, Phys. Rev. E, 2025, 111, 044111

[42] *Kinetic theory of stellar systems: A tutorial*,
Hamilton, C., **Fouvry, J.-B.**, 2024, Phys. Plasmas, 31, 120901

[41] *Non-resonant relaxation of rotating globular clusters*,
Tep, K., **Fouvry, J.-B.**, Pichon, C., 2024, A&A, 689, A126

[40] *Dynamical large deviations for long-range interacting inhomogeneous systems without collective effects*,
Feliachi, O., **Fouvry, J.-B.**, 2024, Phys. Rev. E, 110, 024108

[39] *Predicting the linear response of self-gravitating stellar spheres and discs with LinearResponse.jl*,
Petersen, M., Roule, M., **Fouvry, J.-B.**, Pichon, C., Tep, K., 2024, MNRAS, 530, 4378

[38] *Kinetic blockings in long-range interacting systems*,
Fouvry, J.-B., Roule, M., 2023, Phys. Rev. E, 108, 054108

[37] *Constraining intermediate-mass black holes from the stellar disc of SgrA**,
Fouvry, J.-B., Bustamante-Rosell, M. J., Zimmerman, A., 2023, MNRAS, 526, 1471

[36] *Milankovitch equations with spinors*,
Deme, Barnabás, **Fouvry, J.-B.**, 2023, Celest. Mech. Dyn. Astron., 135, 47

[35] *Astrophysics with the Laser Interferometer Space Antenna*,
LISA Collaboration including **Fouvry, J.-B.**, 2023, Living Rev. Relativ., 26, 2

[34] *Kinetic theory of one-dimensional inhomogeneous long-range interacting* N*-body systems at order* $1/N^2$ *without collective effects*,
Fouvry, J.-B., 2022, Phys. Rev. E, 106, 054123

[33] *Long-term relaxation of* $1D$ *self-gravitating systems*,
Roule, M., **Fouvry, J.-B.**, Pichon., C., Chavanis, P.-H., 2022, Phys. Rev. E, 106, 044118

[32] *Orbital alignment and mass segregation in galactic nuclei via vector resonant relaxation*,
Magnan, N., **Fouvry, J.-B.**, Pichon., C., Chavanis, P.-H., 2022, MNRAS, 514, 3452

[31] *Non-resonant relaxation of anisotropic globular clusters*,
Tep, K., **Fouvry, J.-B.**, Pichon., C., 2022, MNRAS, 514, 875

[30] *Linear response theory and damped modes of stellar clusters*,
Fouvry, J.-B., Prunet, S., 2022, MNRAS, 509, 2443

[29] *Secular Dynamics around a Supermassive Black Hole via Multipole Expansion*,
Fouvry, J.-B., Dehnen, W., Tremaine, S., Bar-Or, B., 2022, ApJ, 931, 8

[28] *Mapping the Galactic centre's dark cluster via Resonant Relaxation*,
Tep, K., **Fouvry, J.-B.**, Pichon, C., Heißel, G., Paumard, T., Perrin, G., Vincent, F., 2021, MNRAS, 506, 4289

[27] *Resonant and non-resonant relaxation of globular clusters*,
Fouvry, J.-B., Hamilton, C., Rozier, S., Pichon, C., 2021, MNRAS, 508, 2210

[26] *Relaxation in a Fuzzy Dark Matter Halo. II. Self-consistent kinetic equations*,
Bar-Or, B., **Fouvry, J.-B.**, Tremaine, S., 2021, ApJ, 915, 27

[25] *Kinetic theory of one-dimensional homogeneous long-range interacting systems with an arbitrary potential of interaction*,
Fouvry, J.-B., Chavanis, P.-H., Pichon, C., 2020, Phys. Rev. E, 102, 052110

[24] *Young stellar cluster dilution near supermassive black holes: the impact of Vector Resonant Relaxation on neighbour separation*,
Giral Martìnez, J., **Fouvry, J.-B.**, Pichon, C., 2020, MNRAS, 499, 2714

[23] *The Strength of the Dynamical Spiral Perturbation in the Galactic Disk*,
Eilers, A.-C., Hogg, D., Rix, H.-W., Frankel, N., Hunt, J., **Fouvry, J.-B.**, Buck, T., 2020, ApJ, 900, 186

[22] *Kinetic theory of* $1D$ *homogeneous long-range interacting systems sourced by* $1/N^2$ *effects*,
Fouvry, J.-B., Bar-Or, B., Chavanis, P.-H., 2019, Phys. Rev. E, 100, 052142

[21] *Vector Resonant Relaxation of Stars around a Massive Black Hole*,
Fouvry, J.-B., Bar-Or, B., Chavanis, P.-H., 2019, ApJ, 883, 161

[20] *Mapping the stability of stellar rotating spheres via linear response theory*,
Rozier, S., **Fouvry, J.-B.**, Breen, P. G., Varri, A. L., Pichon, C., Heggie, D. C., 2019, MNRAS, 487, 711

[19] *Instabilities in disc galaxies: from noise to grooves to spirals*,
De Rijcke, S., **Fouvry, J.-B.**, Pichon, C., 2019, MNRAS, 484, 3198

[18] *Secular dynamics of long-range interacting particles on a sphere in the axisymmetric limit*,
Fouvry, J.-B., Bar-Or, B., Chavanis, P.-H., 2019, Phys. Rev. E, 99, 032101

[17] *How gravitational softening affects galaxy stability. I. Linear mode analysis of disc galaxies*,
De Rijcke, S., **Fouvry, J.-B.**, Dehnen, W., 2019, MNRAS, 485, 150

[16] *Relaxation in a Fuzzy Dark Matter Halo*,
Bar-Or, B., **Fouvry, J.-B.**, Tremaine, S., 2019, ApJ, 871, 28

[15] *Relaxation in self-gravitating systems*,
Fouvry, J.-B., Bar-Or, B., 2018, MNRAS, 481, 4566

[14] *Revisiting relaxation in globular clusters*,
Hamilton, C., **Fouvry, J.-B.**, Binney, J., Pichon, C., 2018, MNRAS, 481, 2041

[13] *Scalar Resonant Relaxation of Stars around a Massive Black Hole*,
Bar-Or, B., **Fouvry, J.-B.**, 2018, ApJ, 860, 23

[12] *The secular evolution of discrete quasi-Keplerian systems. II. Application to a multi-mass axisymmetric disc around a supermassive black hole*,
Fouvry, J.-B., Pichon, C., Chavanis, P.-H., 2017, A&A, 609, A38

[11] *Distribution functions for resonantly trapped orbits in the Galactic disc*,
Monari, G., Famaey, B., **Fouvry, J.-B.**, Binney, J., 2017, MNRAS, 471, 4314

[10] *Resonant thickening of self-gravitating discs: imposed or self-induced orbital diffusion in the tightly wound limit*,
Fouvry, J.-B., Pichon, C., Chavanis, P.-H., Monk, L., 2017, MNRAS, 471, 2642

[9] *Dressed diffusion and friction coefficients in inhomogeneous multi-component self-gravitating systems*,
Heyvaerts, J., **Fouvry, J.-B.**, Chavanis, P.-H., Pichon, C., 2017, MNRAS, 469, 4193

[8] *The secular evolution of discrete quasi-Keplerian systems. I. Kinetic theory of stellar clusters near black holes*,
Fouvry, J.-B., Pichon, C., Magorrian, J., 2016, A&A, 598, A71

[7] *Functional integral derivation of the kinetic equation of two-dimensional point vortices*,
Fouvry, J.-B., Chavanis, P.-H., Pichon, C., 2016, Phys. Lett. A, 380, 2589

[6] *Functional integral approach to the kinetic theory of inhomogeneous systems*,
Fouvry, J.-B., Chavanis, P.-H., Pichon, C., 2016, Physica A, 459, 117

[5] *Secular diffusion in discrete self-gravitating tepid discs. II. Accounting for swing amplification via the matrix method*,
Fouvry, J.-B., Pichon, C., Magorrian, J., Chavanis, P.-H., 2015, A&A, 584, A129

[4] *Secular diffusion in discrete self-gravitating tepid discs. I. Analytic solution in the tightly wound limit*,
Fouvry, J.-B., Pichon, C., Chavanis, P.-H., 2015, A&A, 581, A139

[3] *Self-gravity, Resonances, and Orbital Diffusion in Stellar Disks*,
Fouvry, J.-B., Binney, J., Pichon, C., 2015, ApJ, 806, 117

[2] *Secular resonant dressed orbital diffusion - II. Application to an isolated self-similar tepid galactic disc*,
Fouvry, J.-B., Pichon, C., 2015, MNRAS, 449, 1982

[1] *Secular resonant dressed orbital diffusion - I. Method and WKB limit for tepid discs*,
Fouvry, J.-B., Pichon, C., Prunet, S., 2015, MNRAS, 449, 1967