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EDUCATION

PONTIFÍCIA UNIVERSIDADE CATÓLICA DO RIO DE JANEIRO
B.S. Physics, December 1989

PONTIFÍCIA UNIVERSIDADE CATÓLICA DO RIO DE JANEIRO
M.S. Physics, June 1991
Thesis: *Pressure and Composition Effects in the Gap Properties of* $Al_xGa_{1-x}As$

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Ph.D. Physics, June 1996
Thesis: *Ab Initio Studies of Semiconductors: Defects, Surfaces and Interfaces*

WORK EXPERIENCE

- 2021-2024 **Brazilian Nanotechnology National Laboratory, Brazilian Center for Research in Energy and Materials**
  Director

- 1997-2021 **Instituto de Física, Universidade Federal do Rio de Janeiro**
  Full Professor
  - Research activities in theoretical physics of condensed matter and nanostructured systems
  - Undergraduate and graduate teaching
  - Visiting scholar at U. C. Berkeley (Physics Department) – 2004 and 2010

HONORS AND AWARDS

- John Simon Guggenheim Memorial Foundation Fellowship – 2003
- "Young Scientist" Prize - Physics, TWAS-ROLAC, 2009
- Research Fellow 1A (highest rank) of the Brazilian Council of Research (CNPq)
- Member of the Brazilian Academy of Sciences
- President of the Brazilian Physical Society (2023-2025)

BIBLIOMETRICS (Google Scholar)

- 164 articles
- 13,809 citations
- h-index = 45

ARTICLES

1. *Growth-driven ordering and anisotropy in semiconductor alloys*, R. B. Capaz, G. F. Preger e B. Koiller, Phys. Rev. B **40**, 8299 (1989).
2. *Gap states and localization properties of 1-D Fibonacci quasicrystals*, R. B. Capaz, B. Koiller e S. L. A. Queiroz, Phys. Rev. B **42**, 6402 (1990).
3. *Walks and polymers in two dimensions: dependence of the amplitudes on the valence angle*, R. B. Capaz e C. M. Chaves, Phys. Rev. B **44**, 2366 (1991).
4. *Physical criteria for the direct-to-indirect gap crossover in* $Al_xGa_{1-x}As$ *alloys*, R. B. Capaz, J. P. von der Weid e B. Koiller, Appl. Phys. Lett. **60**, 704 (1992).
5. *Partial ordering effects in* $In_xGa_{1-x}P$, R. B. Capaz e B. Koiller, Phys. Rev. B **47**, 4044 (1993).
6. *Pressure and composition effects on the gap properties of* $Al_xGa_{1-x}As$, R. B. Capaz, G. C. de Araújo, B. Koiller e J. P. von der Weid, J. Appl. Phys. **74**, 5531 (1993).
7. *Gap properties of semiconductor alloys*, R. B. Capaz e B. Koiller, Braz. J. Phys. **23**, 161 (1993) – Proceedings of the *Workshop on Crystalline and Amorphous Silicon and its Alloys*, May 27-29, 1992, Campinas, Brazil.
8. *Identification of the migration path of interstitial carbon in silicon*, R. B. Capaz, A. Dal Pino Jr. e J. D. Joannopoulos, Phys. Rev. B **50**, 7439 (1994).
9. *Manifestation of quantum chaos in electronic band structures*, E. R. Mucciolo, R. B. Capaz, B. L. Altshuler e J. D. Joannopoulos, Phys. Rev. B **50**, 8245 (1994).
10. *Direct-to-indirect crossover in semiconductor alloys: A first-order phase transition?*, B. Koiller e R. B. Capaz, Phys. Rev. Lett. **74**, 769 (1995).
11. *Ab initio studies of GaN epitaxial growth on SiC*, R. B. Capaz, H. Lim e J. D. Joannopoulos, Phys. Rev. B **51**, 17755 (1995).
12. *Signatures of bulk and surface arsenic antisite defects in GaAs(110)*, R. B. Capaz, K. Cho e J. D. Joannopoulos, Phys. Rev. Lett. **75**, 1811 (1995).
13. *Ab initio studies of adatom vacancies on the Si(111)-(7x7) surface*, H. Lim, K. Cho, R. B. Capaz, J. D. Joannopoulos, K. D. Brommer e B. E. Larson, Phys. Rev. B **53**, 15421 (1996).
14. *Unified approach for the calculation of force constants and accelerated convergence of atomic coordinates*, R. B. Capaz e J. D. Joannopoulos, Phys. Rev. B **54**, 13393 (1996).
15. *Disorder and size effects in the envelope function approximation*, T. G. Dargam, R. B. Capaz e B. Koiller, Phys. Rev. B **56**, 9625 (1997).
16. *Critical analysis of the virtual crystal approximation*, T. G. Dargam, R. B. Capaz e B. Koiller, Braz. J. Phys. **27**/**A**, 299 (1997) – Proceedings of the *8th Brazilian Workshop on Semiconductor Physics*, February 1997, Águas de Lindóia, Brazil.
17. *Theory of carbon-carbon pairs in silicon*, R. B. Capaz, A. Dal Pino Jr., e J. D. Joannopoulos, Phys. Rev. B **58**, 9845 (1998).
18. *Atomic segregation and the optical properties of GaAs/AlAs heterostructures*, B. Koiller, R. B. Capaz e H. Chacham, Rev. Mex. Fís. **44**, Supl. 3, 150 (1998) – Proceedings of the *XIV Simposio Latinoamericano de Física del Estado Sólido*, January 1998, Oaxaca, México.
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21. *Segregation, interface morphology, and the optical properties of GaAs/AlAs quantum wells: A theoretical study*, B. Koiller, R. B. Capaz e H. Chacham, Phys. Rev. B. **60**, 1787 (1999).
22. *Role of interface imperfections on intervalley coupling in GaAs/AlAs superlattices*, J. G. Menchero, B. Koiller e R. B. Capaz, Phys. Rev. Lett. **83**, 2034 (1999).
23. *Semiconductor heterostructures with non-ideal interfaces: electronic structure and optical properties*, R. B. Capaz, T. G. Dargam, A. S. Martins, B. Koiller e H. Chacham, phys. stat. sol. (a) **173**, 235 (1999) – Proceedings of the *2nd German-Brazilian Workshop on Applied Surface Science*, September 1998, Templin, Germany.
24. *Density-functional and plane-wave approach to structural properties of poly(p-phenylene) and poly(p-phenylene vinylene)*, R. B. Capaz e M. J. Caldas, J. Mol. Struct. (Theochem) **464**, 31 (1999) – Proceedings of the *IX Simpósio Brasileiro de Química Teórica*, November 1997, Caxambu, Brazil.

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77. *Gap opening by asymmetric doping in graphene bilayers*, M. G. Menezes, R. B. Capaz and J. L. B. Faria, Phys. Rev. B 82, 245414 (2010).
78. *Properties of Charged Defects on Unidimensional Polymers*, J. F. P. Leal, S. J. S. da Silva, E. R. Granhen, C. A. B. Silva Jr., M. Dionízio Moreira, C. A. Achete, R. B. Capaz and J. Del Nero, J. Comp. Theo. Nanoscience 8, 541 (2011).
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86. *Intervalley coupling for interface-bound electrons in silicon: An effective-mass study*, A. L. Saraiva, M. J. Calderón, R. B. Capaz, X. Hu, S. Das Sarma, and Belita Koiller, Phys. Rev. B 84, 155320 (2011).

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