

# Bruno Ximenez R. Alves

## Curriculum Vitae

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Birth date: 12/10/1988, Nationality: Brazilian

## Research/work experience

- June/2018–present **Post-doc at SYRTE: Strontium optical lattice clocks**, France.  
The research project on metrology of time and frequency, focused on improving the accuracy and the frequency stability of the  $^{87}\text{Sr}$  optical clocks at SYRTE using quantum spin squeezing techniques.
- 2015–2018 **PhD: Laser spectroscopy of antihydrogen and fundamental symmetries**, CERN/Aarhus University–Denmark.  
I did my PhD at the ALPHA collaboration at CERN. During this period we measured, for the first time ever observed, the absolute frequency of the 1S-2S transition on antihydrogen atoms using laser spectroscopy and modern time and frequency metrology techniques.
- 2013–2015 **Masters at UFRJ**, RIO DE JANEIRO, Brazil.  
Masters in laser spectroscopy of Lithium atoms and molecules ( $\text{Li}_2$ ,  $\text{CaH}$ ) in cryogenic environment.
- 2013 **Summer Student**, CERN, Switzerland.  
Internship at CERN working at the ALPHA collaboration at the Antiproton decelerator: development of electronics integrating the FPGA pressure control system of the cryostat.
- 2008 **Elevadores Ideal (Elevator company)**, Rio de Janeiro, Brazil.  
Company dedicated to elevators in residencial and commercial buildings. I was responsible for the Modernization department, in charge of replacing old electric relay-based elevator boards by modern electronic technology based on microcontrollers and frequency inverters.

## Other degrees and relevant training

- 2017 **Frequency combs training**, Menlo Systems, Germany.
- 2008–2012 **Bachelor in Physics**, Universidade Federal do Rio de Janeiro, UFRJ, Brazil.
- 2005–2007 **Technician degree in electronics**, Centro Federal de Educação Tecnológica Celso Suckow da Fonseca, CEFET/RJ, Brazil.

## Software skills

- Data analysis Python, Cpp, Mathematica.
- Mechanical designs Solid Works, Inventor.
- Hardware control LABVIEW, Arduino.
- Electronics design PCBExpress, Altium.

## Languages

- Portuguese **Mother tongue**
- English **Fluent**
- Spanish **Intermediare – B1/B2**
- French **Intermediare – B1/B2**

## A few hobbies

Music (bass and acoustic guitar), languages, cooking, gardening, football, cycling.

## Published Articles

- 2020 Ahmadi, M., **Alves, B.X.R.**, Baker, C.J. et al. Investigation of the fine structure of antihydrogen. **Nature** **578**, 375–380 (2020).
- 2018 Ahmadi, M., **Alves, B.X.R.**, Baker, C.J. et al. "Observation of the 1S–2P Lyman- $\alpha$  transition in antihydrogen". **Nature**, vol. **561** (2018)
- 2018 Ahmadi, M., **Alves, B.X.R.**, Baker, C.J. et al. "Characterization of the 1S–2S transition in antihydrogen". **Nature**, vol. **557** (2018)
- 2018 Ahmadi, M., **Alves, B.X.R.**, Baker, C.J. et al. "Enhanced Control and Reproducibility of Non-Neutral Plasmas". **Physical Review Letters** **120**, (2018)
- 2017 Ahmadi, M., **Alves, B.X.R.**, Baker, C.J. et al. "Antihydrogen accumulation for fundamental symmetry tests". **Nature Communications**, vol. **8** (2017)
- 2017 Ahmadi, M., **Alves, B.X.R.**, Baker, C.J. et al. "Observation of the hyperfine spectrum of antihydrogen". **Nature**, vol. **548** (2017)
- 2016 Ahmadi, M., **Alves, B.X.R.**, Baker, C.J. et al. "Observation of the 1S–2S transition in trapped antihydrogen". **Nature**, vol. **541** (2016)
- 2015 Sacramento R, Oliveira A, **Alves B**, Silva B, Li M, Wolff W, Cesar C. "Matrix isolation sublimation: An apparatus for producing cryogenic beams of atoms and molecules". **Review of Scientific Instruments**, vol. **86** (2015)
- 2014 Oliveira A, Sacramento R, **Alves B**, Silva B, Wolff W, Cesar C. "Slow ground state molecules from matrix isolation sublimation". **Journal of Physics B: Atomic, Molecular and Optical Physics**, vol. **47** (2014) p. 245302
- 2012 Sacramento R , **Alves B**, Almeida D, Wolff W, Li M, Cesar C. "Source of slow lithium atoms from Ne or H<sub>2</sub> matrix isolation sublimation" **Journal of Chemical Physics**, vol. **136** (2012)