

DR. ANATAEL CABRERA SERRA

Spanish/European. 30th March 1977

ORCID - iNSPIRE-HEP - GOOGLE-SCHOLAR

Experimental particle physicist, specialised in neutrino sciences since DPHIL at the University of Oxford (2005-2001; UK). Scientist staff (CNRS since 2007; no teaching duties), currently affiliated with the IJCLAB and former director (2014-2021) of the UNDERGROUND LNCA at the EdF Chooz Nuclear Reactor (France). I invented **LIQUIDO** (2012) and led major operations in **DOUBLE CHOOZ** but also **JUNO** experiments where I also invented the detector's **DUAL CALORIMETRY** system. Throughout my career, I acquired recognised expertise in neutrino physics, detection (design and optimisation), instrumentation hardware (optical readout, electronics and scintillation systems), simulations, and high-precision (absolute and relative) physics analyses, including complex multi-detector setups for permille systematics control. I currently serve as spokesperson of the **SUPERCHOOZ** (in exploration since 2022; EdF-CNRS), **CLOUD** (since 2023; 11 countries), **ANTIMATTER-OTECH** (since 2020; 5 countries with nuclear industry; EIC-UKRI funded), **LPET-OTECH** (since 2021; CNRS-INSERM; ANR funded), **DOUBLE CHOOZ** (since 2017; 7 countries), and **LIQUIDO** (since 2016; 11 countries). I created most of the scientific international consortia and collaborations I worked on in the context of fundamental science and innovation, including the **SPMT** and **TRANSOCEANIC-FIT JUNO** groups. Academically, I am also active in mentoring (Marie Curie fellows and postdocs), supervision (PhD theses), scientific dissemination (including outreach), and tight international collaborations with institutions in the Americas, Asia and Europe.

There are three main current scientific operations. First, **high precision neutrino physics** focused on measurements of θ_{13} (DOUBLE CHOOZ, SUPERCHOOZ), θ_{12} , δm^2 , Δm^2 (JUNO, SUPERCHOOZ), *Mass Ordering* (mainly JUNO), including **new physics searches** via the violation of fundamental symmetries such as Unitarity or CPT (CLOUD, SUPERCHOOZ). Second, the **exploring of novel scientific opportunities with LIQUIDO** in neutrino physics (sun, reactors, accelerators, geoneutrinos, supernovae, etc.) and rare $\beta\beta$ and proton decays. Third, the development of OTECH projects on their potential **innovation for medical and nuclear (EdF) industries** and cooperation with instrumentation-specialised industry (KURARAY).

ACADEMIC POSITIONS & AFFILIATIONS

since 2007	CNRS SCIENTIST (France)
since 2020	Scientist. Irene Joliot-Curie Laboratory. Université Paris-Saclay (Orsay, France)
2021-2014	Director. LNCA Underground Laboratory. CNRS/CEA (Chooz, France)
2019-2018	Scientist. Linear Accelerator Laboratory. Université Paris-Saclay (Orsay, France)
2018-2007	Scientist. AstroParticle & Cosmology Laboratory. Université Diderot (Paris, France)
2008-2006	MARIE CURIE INTRA-EUROPEAN FELLOW . AstroParticle & Cosmology Laboratory. CNRS (Paris, France)
2006-2005	POSTDOC RESEARCHER . Collège de France. CNRS (Paris, France)

EDUCATION & DEGREES

2005-2001	DPHIL/PHD IN PARTICLE PHYSICS . University of Oxford (UK). MINOS experiment (FNAL, US)
2004	Marie Curie Training Fellow. European Center of Theoretical Physics (Trento, Italy)
2001-1998	BSc PHYSICS , High Energy AstroPhysics & Instrumentation (1 st Class). University of Leeds (UK)
2001	Researcher Student (LHCb). CERN (Switzerland)
2000	CERN Summer Research Student (Delphi/LHCb). CERN (Switzerland)

SCIENTIFIC RESPONSIBILITIES & MANAGEMENT

	INTERNATIONAL RESPONSIBILITIES (time dedication >75%).
since 2023	Co-Spokesperson, CLOUD International Collaboration [20 institutions in 11 countries]*
since 2022	Spokesperson, SUPERCHOOZ PATHFINDER Collaboration [CNRS and EDF]*
since 2021	Spokesperson, LPET-OTECH Collaboration [5 institutions between CNRS & INSERM]*
since 2020	Coordinator/Leadership, ANTIMATTER-OTECH Consortium [6 academic institutions and EdF industry]*
since 2020	Leadership, JUNO'S DUAL-CALORIMETRY . Task Force within the JUNO International Collaboration
since 2017	Spokesperson, DOUBLE CHOOZ . International Collaboration [26 institutions in 7 countries]*
since 2016	Co-Spokesperson, LIQUIDO . International Collaboration [24 institutions in 11 countries]*
	NATIONAL RESPONSIBILITIES (CNRS COORDINATION)
since 2021	ANTIMATTER-OTECH/CLOUD & SUPERCHOOZ Projects*: 3 national laboratories
since 2022	LPET-OTECH Project*: 4 national laboratories
2019-2018	JUNO Experiment*: 5 national laboratories
since 2018	LIQUIDO Project*: 5 national laboratories
2023-2014	DOUBLE CHOOZ Experiment*: 4 national laboratories
2021-2014	LNCA UNDERGROUND LABORATORY* CNRS/CEA/EdF. CHOOZ NUCLEAR REACTOR PLANT (France)
	PREVIOUS COORDINATION ROLES IN THE JUNO INTERNATIONAL COLLABORATION
2020-2015	DUAL-CALORIMETRY & SMALL-PMT (from conception) Detector Systems
2015-2013	Electronics & Online (including conception)
	PREVIOUS COORDINATION ROLES IN THE DOUBLE CHOOZ INTERNATIONAL COLLABORATION
2018-2009	PHYSICS ANALYSIS : Full Collaboration (2018-2015) & European Analysis (2012-2009)
2015-2011	ENERGY RECONSTRUCTION & DETECTION SYSTEMATICS
2018-2007	DETECTORS COMMISSIONING & OPERATIONS (2018-2009) & ELECTRONICS-DAQ-ONLINE (2015-2007)
2013-2005	Data Analysis Framework (DOGS; 2013-2006) & Detector Simulation Framework (RoSS; 2011-2005)

SCIENTIFIC ORGANISATION, COMMITTEES & EVENTS

	Advisory Committee(s): Newton's Publication (CellPress)
	Funding Agencies Peer Review: Canada (NSERC), Europe (ERC), Spain & Switzerland.
	Publication Peer Review: Nature, JHEP, JINST, NIM-A, PRL (typically ~1 publication per year)
2020-2018	Host & Scientific Organising Committee. National $\beta\beta$ Physics Workshop (France)
2020-2015	Reactor- θ_{13} Group (Daya Bay, Double Chooz, RENO). Steering Committee
2018	Scientific Organising Committee: "Multi-PMT Technology for Large Neutrino Detector" Workshop
	Convener in Neutrino International Conferences: EPS-HEP-2013 (Sweden) and NOW-2010 (Italy)

ACADEMIC HOSTING OF VISITING PROFESSORS

- 2023-2022 Sabbatical of Prof. M. Chen (Queen's University, Canada) at IJCLab (France)
Novel opaque scintillators, new techniques for cosmogenic background mitigation, solar and $\beta\beta$ physics with LiquidO
Coordination*: **EMILIE DU CHÂTELET**, Univeristé Paris-Saclay (Paris)
- 2021-2020 Sabbatical of Prof. H. Nunokawa (PUC University, Brasil) at IJCLab (France)
Phenomenological programmes of SuperChooz, CLOUD, and LiquidO and JUNO's mass ordering potential
- 2018-2016 Sabbatical of Prof. F. Suekane (Tohoku University, Japan) at APC (France)
First LiquidO prototype designs, physics potential with LiquidO and collaboration (co-spokesperson)
Coordination*: **BLAISE PASCAL CHAIRE**, École Normal Supérieur (Paris)

ACADEMIC/SCIENTIFIC MENTORING

16 RESEARCHERS: 2 Marie Curie Intra-European Fellows and 14 Post-Doc Researchers (including 7 co-mentoring)

ACADEMIC SUPERVISION

- Context:** Either directly or through effective supervision, leading to the main thesis results.
15 PHD STUDENTS (1 on-going). Co-supervisions with institutions in Brasil, China, France, Japan, Russia, US
11 MASTER STUDENTS' FINAL YEAR RESEARCH from institutions in China, France, Japan, Spain, US

ACADEMIC TRAINING

- Context:** Minimal teaching activities due to other many responsibilities – no duties as CNRS scientist.
Specialised Research Schools: VSON (2022), VSON (2021), IMFP (2021), ISAPP School (2018)
~10 Lectures for PhD Research Courses – Université de Paris-Sorbonne, etc.

SCIENTIFIC/INNOVATION COLLABORATIONS/CONSORTIA & ROLES

- since 2023 Leadership Cooperation with KURARAY (Japan): Innovation (co-development of new fibre technology)
- since 2017 Leadership Cooperation with EDF (France): Innovation (reactor monitoring instrumentation) & Research
- since 2023 Co-Leadership* (Foundation): **CLOUD** International Collaboration (~80 scientists, 11 countries)
- since 2022 Leadership* (Foundation): **SUPERCHOOZ PATHFINDER**. CNRS & EdF Collaboration (France)
- since 2020 Leadership* (Foundation): **LPET-OTech** Consortium (~20 scientists, France)
- since 2020 Leadership* (Foundation): **ANTIMATTER-OTech** Consortium (~50 scientists in Europe and **EDF**)
- since 2016 Co-Leadership* (Foundation): **LIQUIDO** International Collaboration (~100 scientists, 11 countries)
- since 2013 Coordination(s)*: **JUNO** International Collaboration (~700 scientists, 18 countries)
- since 2005 Leadership*/Coordination(s): **DOUBLE CHOOZ** International Collaboration (~100 scientists, 7 countries)
- 2022-2018 Coordinator*: CNRS-Japan (Tohoku University) Particle Physics Laboratory. Context: LiquidO
- 2022-2015 Coordinator*: CNRS-South Korea (SNU) Particle Physics Laboratory. Context: Reactor Neutrinos.
- 2020-2014 Coordinator*: CNRS-China (IHEP) Particle Physics Laboratory Project: JUNO
- 2018-2014 Coordinator*: CNRS-Russia (Kurchatov Institute) Particle Physics Laboratory. Context: Double Chooz
- 2015-2013 Coordinator*: CNRS-Japan (KEK Laboratory) Particle Physics Laboratory. Context: Double Chooz.

SCIENTIFIC GRANTS, PUBLICATIONS, COMMUNICATION & OUTREACH

- 2024 Funding **ANR** (**DUALCALOPERMILLEJUNO 0.58M€**). High Precision Neutrino Research in JUNO
- 2023 Funding **EU-HOP'ON** (**SHINE 1.3M€**). Innovation on Novel Scintillation Formulations & Optical Fibre Readout
- 2021 Funding **EIC-PATHFINDER** (**ANTIMATTER-OTech 5.7M€**). Innovation on Nuclear Reactor Industry
- 2021 Funding **ANR** (**TEP-OTech 0.65M€**). Innovation on Medical Physics & Industry
- 2020 Funding **ERC-SyG** ("A" & Interviewed: not obtained). Fundamental Neutrino Physics
- 2015 Funding **ERC-CoG** ("A" & Interviewed: not obtained). LiquidO-based R&D on Fundamental Neutrino Physics
- since 2014 Funding **CNRS NATIONAL**: LiquidO, Double Chooz, JUNO & LNCA laboratory
10 First Results/Project Releases / colloquia (3 CERN, 2 FNAL, 3 KEK, 1 IHEP) / 3 talks Neutrino Conference
>90 Publications (mostly peer reviewed). Further details in **ORCID**
>800 Collaboration Internal Documents in Double Chooz, JUNO, LiquidO, CLOUD/AntiMatterOTech, etc.
≥150 National / International Conference and Workshops
≥100 International Conferences Contributions (Talks & Posters)
≥100 Seminars. Many Institutions in the Americas, Asia and Europe
~10 outreach science articles and 2 radio-related programs (including youtube).
- 2007-2009 Outreach Project in Paris-based High Schools (cosmic rays detector) – Scientist Responsible

EXPERIMENTAL EXPERIENCE & EXPERTISE HIGHLIGHTS

- since 2020 Conceptual Design (testing): **NOVEL OPTICAL FIBRE TECHNOLOGY** – co-development with Kuraray (Japan)
- since 2018 Conceptual Design & First Sensitivity: **GeV LIQUIDO DETECTOR/EXPERIMENT**
- since 2016 Conceptual Design & First Sensitivity: **MULTI-TON $\beta\beta$ LIQUIDO DETECTOR/EXPERIMENT**
- since 2014 Conceptual Design (testing): **NOVEL OPAQUE SCINTILLATOR(S) TECHNOLOGY** – TIHQ collaboration (2023)
- 2023-2022 Conceptual Design & First Sensitivity: **CLOUD-III EXPERIMENT** (under exploration)
- 2023-2020 Conceptual Design & First Sensitivity: **CLOUD-II EXPERIMENT** (under exploration)
- 2020 Conceptual Design & First Sensitivity: **ANTIMATTER-OTech PROJECT / CLOUD-I** (under construction)
- 2020-2019 Conceptual Design & First Sensitivity: **LPET-OTech PROJECT** (under exploration)
- 2019-2017 Conceptual Design & First Sensitivity: **SUPERCHOOZ EXPERIMENT** (under exploration)
- 2020-2015 Conceptual Design: **ASIC BATTERY ELECTRONICS CARD**. Context: **JUNO**
- 2019-2015 Conceptual Design: **LIQUIDO's PROTOTYPE READOUT SYSTEM** (μ SiC, SiC, SiBB cards)
- 2016-2015 Conception, Design: **JUNO's PMT Occulting Light Concentrator** (not retained)
- 2022-2014 Conception, Design (TDR level) & Construction: **JUNO SPMT SYSTEM** (25,000 3" PMT with full readout)
- 2020-2014 Invention/Conception, Design & Implementation: **JUNO DUAL CALORIMETRY DETECTOR**
- 2015-2014 Conception & Design (CDR level): **JUNO LPMT READOUT** (FADC system digitisation expertise)
- 2020-2012 Invention/Conception, Design & Prototyping: **LIQUIDO DETECTION**
- 2018-2008 Construction, Commissioning & Running (10 years): **DOUBLE CHOOZ DETECTOR(s)**
- 2012-2007 Design, Commissioning & Running: **DOUBLE CHOOZ FADC READOUT & DAQ/ONLINE**
- 2009-2005 Conception & Implementation: **DOUBLE CHOOZ ANALYSIS FRAMEWORK & READOUT SIMULATION**
- since 2003 Expertise in **MULTI-DETECTOR SYSTEMATIC CONTROL** (MINOS, Double Chooz, SuperChooz, JUNO+TAO)

SCIENTIFIC RESULTS DISSEMINATION HIGHLIGHTS

Non-exhaustive list of the most recent and relevant latest official results releases (presentations, publications, etc.), including publications under active and ongoing preparation (typically in collaboration).

writeup	[1] LIQUIDO COLLAB. GeV-scale Neutrino Detection & Methodology
writeup	[2] A. Cabrera & H. Nunokawa <i>et al.</i> Unitarity Violation Explorations in Neutrino Physics (phenomenology)
writeup	[3] LIQUIDO COLLAB. LiquidO-based Potential of $\beta\beta$ -Decay Explorations
writeup	[4] SUPERCHOOZ COLLAB. First Experiment Publication
preparation	[5] A. Cabrera & M. Chen <i>et al.</i> Cosmogenic Background in $\beta\beta$ -Decay Explorations
preparation	[6] Small Author List. New Optical Fibre Technology & Methodology (under embargo for industrial patent)
2025 [Ref]	[7] LIQUIDO COLLAB. Stochastic Confirment Experimental Demonstration
2024 [Ref]	[8] A. Cabrera. OPAQUE SCINTILLATION. ECFA-DRD Workshop, CERN. First Review on Topic
2023 [Ref]	[9] A. Cabrera & Y. Han <i>et al.</i> Neutrino Detector Multi-Calorimetry Conception
2023 [Ref]	[10] A. Cabrera & CLOUD COLLAB. Neutrino Telescope Conference (Venice): First Release of the Experiment
2023 [Ref]	[11] LIQUIDO COLLAB (A. Cabrera <i>et al.</i>). Novel LiquidO-based Potassium Geoneutrino Methodology
2023 [Ref]	[12] A. Cabrera & LIQUIDO COLLAB. FNAL Neutrino Colloquium: Review Project Status & Latest Developments
2022 [Ref]	[13] A. Cabrera. CERN EP-Colloquium: First Experiment Release of SUPERCHOOZ
2022 [Ref]	[14] A. Cabrera & LPET-OTECH COLLAB. IEEE Conference (Milano): First Experiment Release
2022 [Ref]	[15] A. Cabrera & LIQUIDO COLLAB. Neutrino Conference (Soeul): Proof of LiquidO's Detection
2022 [Ref]	[16] JUNO COLLAB (A. Abusleme <i>et al.</i>). <i>Chinese Physics C</i> : Neutrino Oscillations Per mille Precision Sensitivity
2021 [Ref]	[17] JUNO COLLAB (A. Abusleme <i>et al.</i>). <i>JHEP</i> : JUNO's Dual Calorimetry Calibration
2021 [Ref]	[18] LIQUIDO COLLAB (A. Cabrera <i>et al.</i>). <i>Nature Communications Physics</i> : First LiquidO Publication
2020 [Ref]	[19] A. Cabrera <i>et al.</i> <i>Nature Physics Reports</i> : Early Discovery Potential of Neutrino Mass Ordering (phenomenology)
2020 [Ref]	[20] DOUBLE CHOOZ COLLAB (H. de Kerret <i>et al.</i>). <i>Nature Physics</i> : First Multi-Detector Results
2019 [Ref]	[21] P. Ochoa-Ricoux <i>et al.</i> DUNE Module Opportunity Workshop. BNL (US) First Release LIQUIDO GeV-Physics
2019 [Ref]	[22] A. Cabrera & LIQUIDO COLLAB. CERN Detector Seminar: First LiquidO Official Release
2018 [Ref]	[23] A. Cabrera & LIQUIDO COLLAB. NOW Conference (Ostuni): First LiquidO- $\beta\beta$ Pre-Release
2016 [Ref]	[24] A. Cabrera & DOUBLE CHOOZ COLLAB. CERN EP-Colloquium: First Multi-Detector Results Release
2016 [Ref]	[25] A. Cabrera & DOUBLE CHOOZ COLLAB. Neutrino Conference (London): First Multi-Detector Release
2016 [Ref]	[26] A. Cabrera. FROST Workshop (FNAL): First Release of JUNO's Dual Calorimetry Detector Design
2012 [Ref]	[27] DOUBLE CHOOZ COLLAB (Abe Y. <i>et al.</i>). <i>Physics Review Letters</i> : First Positive Evidence of θ_{13}
2010 [Ref]	[28] A. Cabrera & DOUBLE CHOOZ COLLAB. Neutrino Conference (Athens) First Detector Data Release

LANGUAGES [CEFR]: Spanish (native,C2), English (C2), French (C2), Italian (fluent), Portuguese (basic)

* Indicates the responsibilities/roles involving the management of resources (personnel and funding).