Alessandro Manfredini

Curriculum Vitae

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Personal Details

Birth November 11th 1985, Rome, Italy.

Nationality Italian.

Education

2018–Present Postdoctoral Fellow in Astroparticle Physics.

University Of Zurich, Zurich, Switzerland.

2014–2018 Postdoctoral Fellow in Astroparticle Physics.

Weizmann Institute of Science, Rehovot, Israel.

2011–2014 Ph.D. Student of International Max Planck Research School.

Max-Planck Institute For Physics, Munich, Germany.

2008–2010 Master of Science in Nuclear and Sub-nuclear Physics.

University of Roma Tre, Rome, Italy. Grade: 110/110 magna cum laude.

Skills

My main expertise is in **statistics** and **data analysis**. I also have four years of experience in automation software (PLC and SCADA systems programming). Proficient in C++, C#, HTML, Javascript, good knowledge of Python. Knowledge of SQL and NoSQL databases as well as data streaming platform like Kafka.

Coordination and Awards

2019 - DARWIN experiment's "electrodes and high voltage" sub-group coordinator.

2016–2018 I was the XENON1T experiment's statistical inference coordinator.

2017 Awarded "senior postdoctoral fellow" at Weizmann Institute of Science.

Second Postdoc

2018-Present I joined the group of Prof. Laura Baudis as co-leader of an R&D project for the future DARWIN dark matter detector (more info here). I am responsible for the design of a fully automated monitoring and control system based on industrial Programmable Logic Controllers (PLC). For this purpose I designed an innovative IoT gateway (OPC-Proxy) that allows to connect an OPC server with a network of microservices or a streaming platform like Kafka.

First Postdoc

2014–2018 I joined the <u>XENON</u> dark matter project in the group of Prof. Ran Budnik. The XENON collaboration consist of more than 100 physicist from all over the world.

Statistics: For two years I was co-leading the statistical inference team of the XENON1T experiment, we performed hypothesis testing with computation of the confidence intervals and developed the statistical model of the experiment.

Data Analysis: I contributed to two independent searches. One performing dark matter search in the framework of Effective Field Theory. The other investigating inelastic dark matter scattering on ¹²⁹Xe isotope.

Slow Control: I was part of the XENON1T slow control developers team. My main contribution was to design the safety and motion control systems for a set of motors and belts used to move calibration sources in the experiment. I also developed the high voltage module controller, and the safety system of the experiment's water recirculation facility.

Research during Ph.D.

I joined the <u>ATLAS</u> experiment at CERN in 2011 under the supervision of Dr. Sandra Kortner. The ATLAS collaboration consist of thousands of physicist all over the world.

Thesis Title: "Search for Neutral MSSM Higgs Bosons in $A/h/H \to \tau^+\tau^- \to e\mu + 4\nu$ Decays with the ATLAS Detector."

Data Analysis My contribution was focused on the estimation of backgrounds and their systematics, the implementation of the probability model for hypothesis testing.

Software Skills

Data Analysis Proficient in C++, Deep knowledge of ROOT framework, ROOSTAT and RooFit. Good knowledge of Python and C#.

Automation PLC ladder diagram, structured text and SCADA programming.

Web Proficient in HTML, CSS, JavaScript, SQL and NoSQL database. Server-side (NodeJS/Django) and client-side programming. Good knowledge of the Kafka streaming platform.

My Git Repositories

 \underline{Xephyr} - A statistical framework (C++).

<u>ImperaJS</u> - An app-state managment framework (Javascript).

Brick-Element - A custom-element generator (Javascript).

OPC-Proxy - A modular OPC gateway (C#).

JaS-HMI - A Javascript HMI framework (Javascript).

Language Skills

Mother tongue Italian

English Fluent - (CEFR C1)

Spanish Good understanding - (CEFR B1)

German Basics - (CEFR A2)