



UNIVERSITÀ  
degli STUDI  
di CATANIA

DIPARTIMENTO DI FISICA E ASTRONOMIA

DOTTORATO DI RICERCA IN FISICA

ANNO ACCADEMICO 2017 - 2018

## TITLE

**Hadron physics at Jefferson Lab:  
New frontiers on trackers, calorimeters and magnetic spectrometers.**

2 CFU

**Teaching staff  
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## Program of the course:

Hadron physics at JLAB: form factors studies and related experiments with CEBAF beam at 12 GeV.

A survey on experimental Halls.

The SBS (Super BigBite Spectrometer) facility in Hall A: magnetic spectrometer (HRS), tracker (GEM modules) and calorimeter (HCAL-J).

The HRS superconducting magnet and its role.

New technologies on tracker system, utilizing GEM gas detectors: the project and the construction of modules. Quality check of GEM foils and assembly in the cleaning room of Catania – Sezione INFN. Tests of GEM modules with cosmic rays and protons.

The hadron calorimeter HCAL-J for SBS, a joint project between INFN, JLab and CMU (Carnegie Mellon University). The single module: absorbers, scintillators, wavelength shifter guides and PMTs. Light collection, efficiency, time resolution and DAQ system of HCAL-J. The arrangement of 288 modules in 4 sub-assemblies.

The proposed and approved experiments on form factors in the Hall A of JLab.

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**Bibliography:**

B. Povh – Particelle e nuclei – Bollati Boringhieri

Sito Web del JLab : <https://www.jlab.org>

E. Cisbani – Overview of Nucleon Form Factor Experiments with 12 GeV at Jefferson Lab – EDP Sciences, 2014

C. W. de Jager et al. – The Super BigBite Spectrometer for Jefferson Lab Hall A -

F. Mammoliti et al. – Test of the GEM Front Tracker for the SBS Spectrometer at Jefferson Lab – CHERNE Workshop – Athens 2012

B. Wojtsekhowski – Nucleon form factors program with SBS at Jlab – IJMP: Conference Series, March, 18 2014