

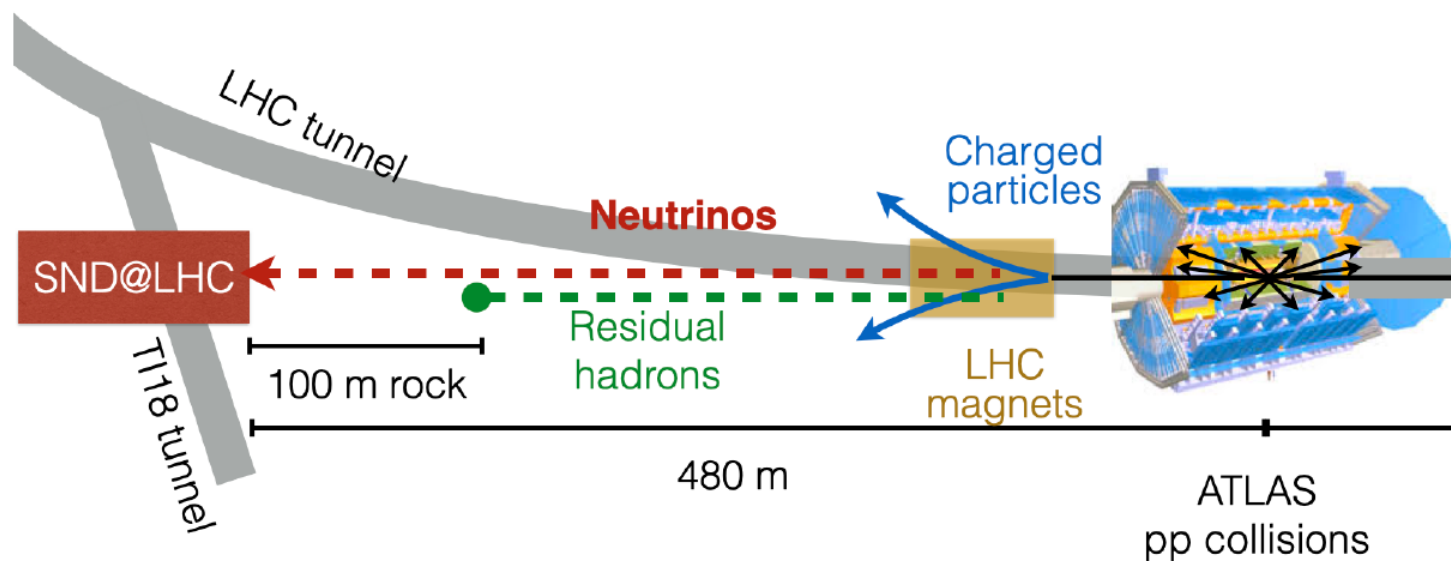


SND@LHC - Bari: attività nel 2022 e piani per il 2023



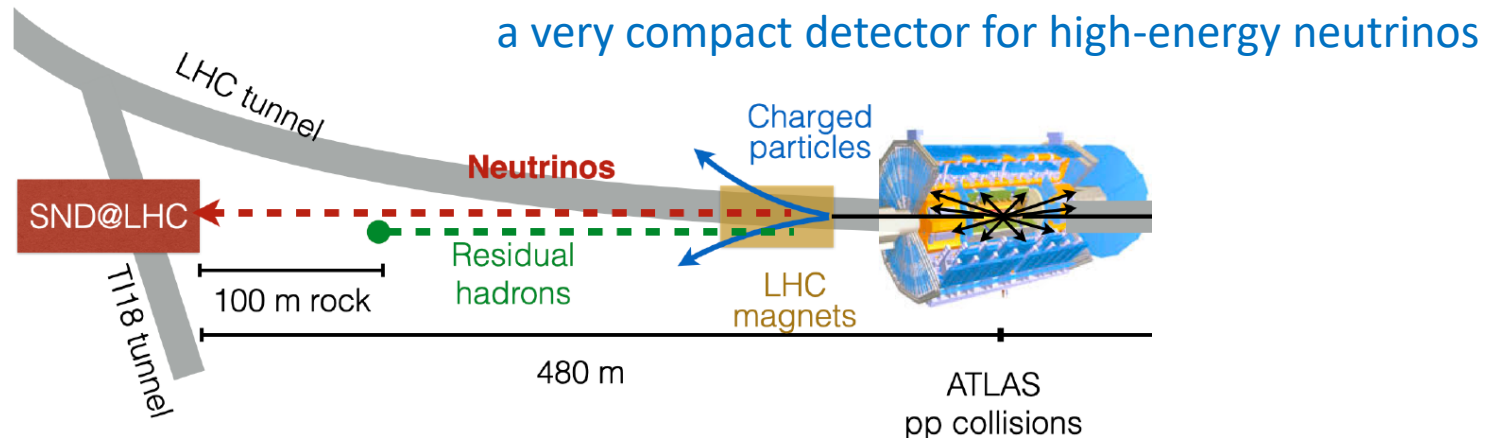
Scattering and Neutrino Detector operating at the LHC

a very compact detector for high-energy neutrinos

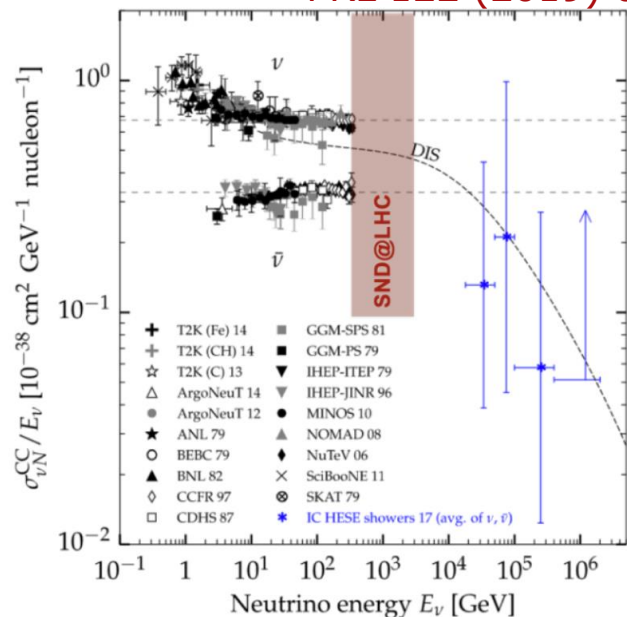




Scattering and Neutrino Detector operating at the LHC



PRL 122 (2019) 041101



CERN is unique in providing energetic ν (from LHC) and measure $pp \rightarrow \nu X$ in an unexplored domain

OPEN ACCESS
IOP Publishing

Journal of Physics G: Nuclear and Particle Physics

J. Phys. G: Nucl. Part. Phys. **46** (2019) 115008 (19pp)
<https://doi.org/10.1088/1361-6471/ab3f7c>

Physics potential of an experiment using LHC neutrinos

OPEN ACCESS
IOP Publishing

Journal of Physics G: Nuclear and Particle Physics

J. Phys. G: Nucl. Part. Phys. **47** (2020) 125004 (18pp)
<https://doi.org/10.1088/1361-6471/aba7ad>

Further studies on the physics potential of an experiment using LHC neutrinos



Stato attività SND@LHC



Expression of Interest, Feb. 2020

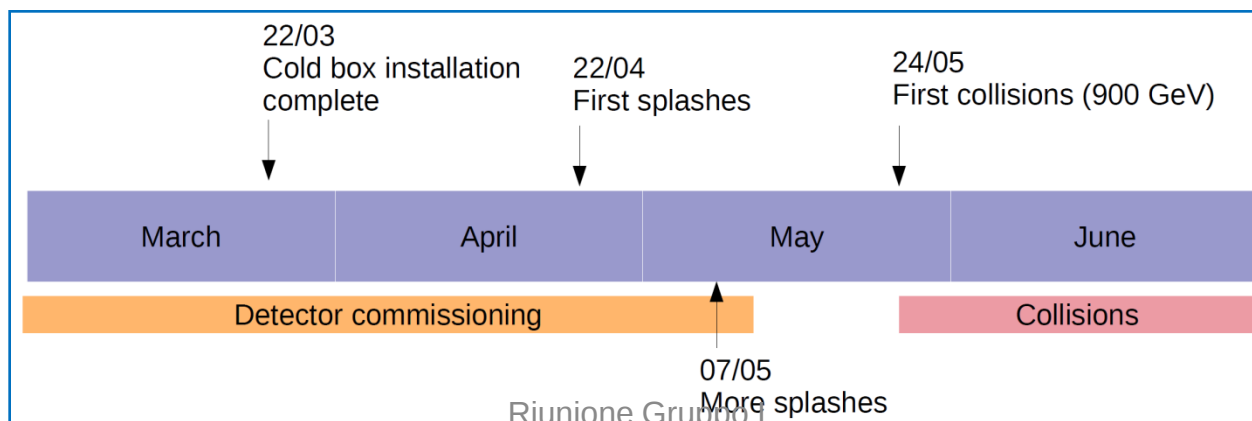
Technical Proposal, Feb. 2021

Approval, March 2021

Start, LHC Run3

→ *Installazione del detector completata*

→ *Detector running*

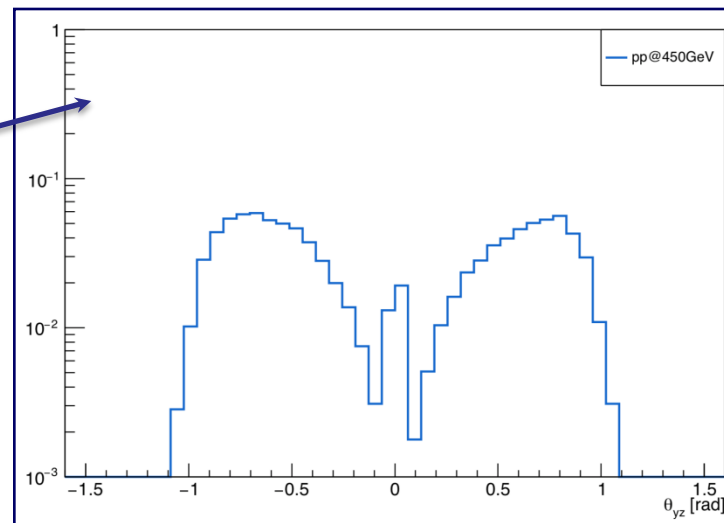




Stato attività SND@LHC

***Prime collisioni nel IP1
a partire dalla fine di Maggio '22***

**Muoni da collisioni pp da 450 GeV
e raggi cosmici**



- ✓ Articolo sul detector sottomesso al JINST joint issue su “Upgrades of the LHC and experiments for Run 3”
- ✓ Nuove pubblicazioni in preparazione



attività 2022 @ Bari

Completamento della attività di R&D sul Muon ID system per SHiP

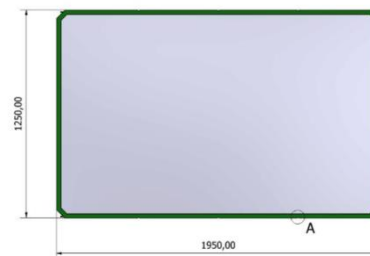
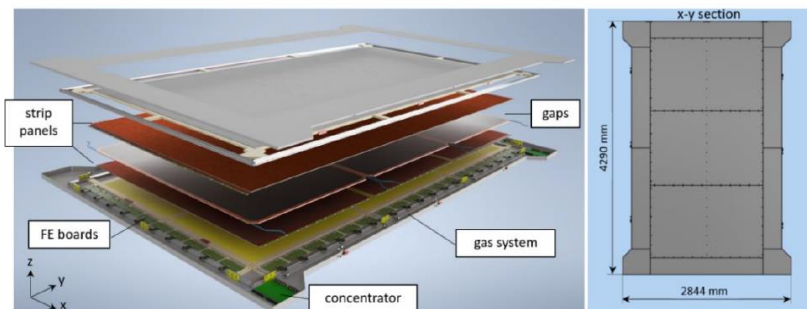
1 Project of an RPC-based Muon Identification System 2 for the neutrino detector of the SHiP experiment

3 Author list ^{a,b}

4 ABSTRACT: The SHiP experiment has been proposed at CERN to shed light on phenomena still
5 unexplained in the framework of the Standard Model, searching for hints of New Physics. A
6 section of the detector will be dedicated to the study of neutrino physics with special emphasis on
7 tau neutrino properties, still very poorly measured. A system to identify the muons produced in
8 neutrino interactions and subsequent short-lived particle decays, based on RPC technology, has
9 been proposed and it is presented in detail in this paper.

paper
under review

✓ Progetto della struttura meccanica degli RPC



V. Valentino, CAD meccanico INFN Bari

Figure 5. Layout of one RPC tracking plane for the SND Muon Identification System (left). Frontal view of its mechanical structure (right).



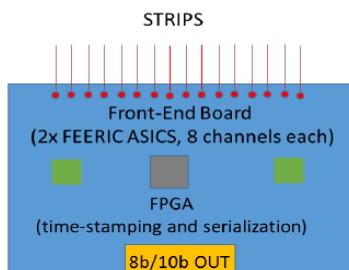
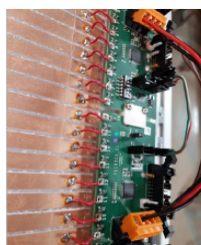
attività 2022 @ Bari

Completamento della attività di R&D sul Muon ID system per SHiP

✓ *Progetto della scheda di Front-End*

G. De Robertis, CAD elettronico INFN Bari

L. Congedo



NEW Front end board

- Same FEERIC Asics
- **FPGA onboard: firmware ready, simulation ok**
- Data with Time Stamp @160MHz
- Zero suppression
- Serial Data trasmission (8b/10b)
- Serial Data Receiver: self trigger, FPGA reprogramming, slow control
- Clock receiver (synchronization)

Front-End Boards



Serial Lines receiver + transmitter + clock

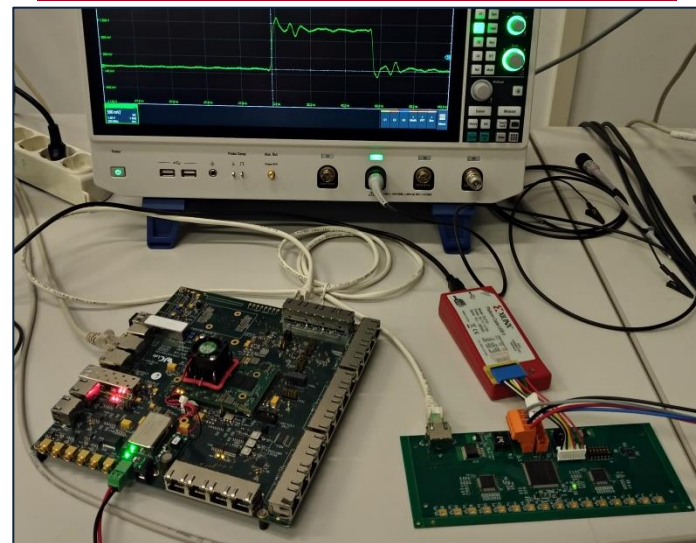
Concentrator

Optical fiber

Readout board

38 FE boards/plane, 2 concentrators / plane

Test FE board e concentratore

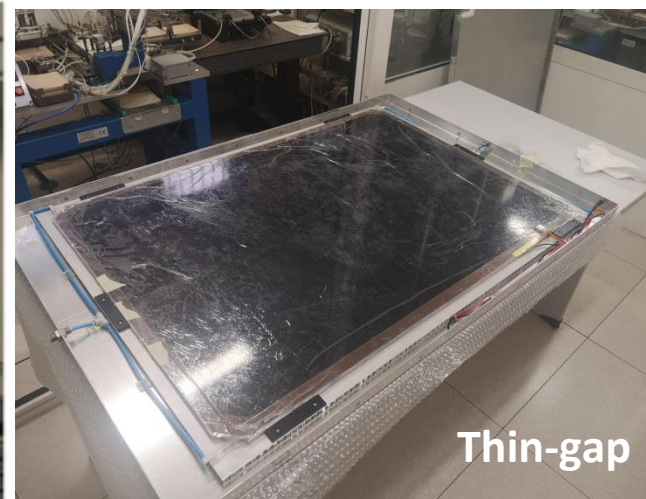
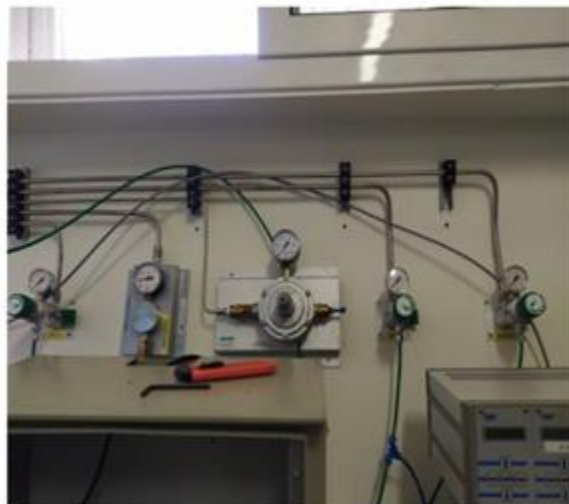




attività 2022 @ Bari

C. Pastore M. Franco e S. Martiradonna,
Officina meccanica INFN Bari

LAB RPC BARI



- **R&D** sull'uso di **miscele** di gas **eco-compatibili** , in **sede** e alla **GIF++** → **ON-GOING**
- **R&D** con **gap** di **spessore ridotto** rispetto agli usuali 2mm. A Bari, l'attività è portata avanti in **sinergia** con CMS e, in particolare, in collaborazione con G. **Iaselli** e G. **Pugliese** → **ON-GOING**
- Esposizione a raggi cosmici del rivelatore instrumentato con gap sottili per **performance test** → **DONE**



attività 2023

Anagrafica 2023:

M. De Serio (20%), R.A. Fini (20%), A. Marrone (10%), M. Pappagallo (10%),
A. Pastore (20%), S. Simone (20%)

- Contributo alla analisi dati delle interazioni di neutrino nel bersaglio
- Handling (al CERN) delle emulsioni nucleari utilizzate nel bersaglio attivo per la misura SND@LHC

Richieste Servizi: **congiunte a LHCB**

Coinvolgimento del personale tecnico nei seguenti ambiti:

A. Andriani, P. Di Pinto

- Handling (al CERN) delle emulsioni nucleari utilizzate nel bersaglio attivo per la misura SND@LHC

