

# The “Nuit des ondes gravitationnelles”

IPPOG Meeting,  
Lisbon – April 20<sup>th</sup> 2017

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#NuitDesOG

Paris  
Annecy  
Nice  
Lyon  
Marseille  
Lille  
Dunkerque  
Nancy  
Bordeaux  
Limoges  
Orléans  
Strasbourg  
Cascina (Italie)  
Florence (Italie)

La nuit  
des  
ondes  
gravita-  
tionnelles

20 mars 2017

Des concours ouverts à tous  
Date limite de dépôt des dossiers le 4er mars 2017  
Inscription préalable obligatoire sur le site

Une soirée festive  
Le 20 mars 2017, au grand Rex à Paris et dans de nombreuses villes  
(liste des villes disponibles sur le site)

<http://www.cnrs.fr/nuit-des-ondes-gravitationnelles/>



# The project: a global multi-thematic event

- The **Night of the Gravitational Waves**
  - **Monday March 20<sup>th</sup>**
- A joint initiative of the **CNRS** and of the **SFP** (French Physics Society)
- A **free public event**
  - To celebrate the anniversary of the gravitational wave detection
  - More an evening than a night actually
    - **From 18:00 to 22:30**
  - **Simultaneously in a dozen locations**
    - In **France** and **Italy** (Florence)
  - Sites interconnected during part of the event
- A project with an educational part
  - **4 contests open to schools and to the general audience**
- Website: <http://www.cnrs.fr/nuit-des-ondes-gravitationnelles>



 [#NuitDesOG](https://twitter.com/NuitDesOG)  
Periscope  
Facebook live

# More details

- **Agenda**

- A mix between **local events** and **live sessions**

- **Schedule** – common to all sites

- 18:00: Door opening
- 18:30: Local conference about gravitational waves
- 20:15: Live connection with the Virgo control room
- 20:30: Interactive quiz – sites compete against one another!
- 21:00: Broadcast of a short movie about the LMA
- 21:15: Debate about science and cinema – from the main site: the « Grand Rex » famous theater in Paris
- 22:30: Ending

- **Contests**

- How to detect chirp signals buried in noise
- How to generate « gravitational waves » (quadrupolar)
- Novel or comics
- Shoot pictures with the [Pocket Black Hole app](#)

- **Live webcast**

- Through the RENATER network and the CNRS/IN2P3 computing center



# The « Nuit » in short



- All local sites happy to have participated to the event
- Room occupancy  $\geq 75\%$  for all sites (close to 100% in Paris!)
  - The « Grand Rex » has 2,700 seats (largest theater in Europe)
  - A mix of large and smaller rooms selected by local organizers
  - Most of the audience stayed until the end of the event
  - Excellent atmosphere everywhere
- Young audience as well
  - For instance: 850 students from 40 classes in Paris
    - E-mailing campaign based on existing mailing lists – e.g. « Passeport »
  - Week of 03/20 was one of the few in the Feb.-Apr. range during which there wasn't any school holiday...
    - twice 2 weeks (Winter and Spring holidays), France divided into 3 zones
- Second topic discussed on Twitter in France that evening
  - First debate for the French presidential election on TV the same night!
  - In total: 684 tweets with [#NuitDesOG](#) + 1896 retweets – 7 Mpeople « reached »
- Facebook: <https://www.facebook.com/cnrs.fr/videos/1475770485779895>
  - 30,000 connections during event; can watch replay from there

~5,000  
spectators  
at sites



# What worked (very) well

- No security problem of any kind
- A **centralized registration system**
  - Based on « [Evenium](#) » and managed by CNRS
  - Each site could open a given number of seats and follow their occupancy rate
- A **mix of big and medium cities** – some quite far from all CNRS labs involved
- The **quiz**: fun and convivial!
  - 7 questions, 4 answers each
  - Majority rule locally, based on color cards shown by the audience
  - Online spreadsheet to send/share the results
  - In case of equally-ranked site, the city with the smallest number of inhabitants wins
  - Winner found among the audience of the winning site by drawing lots
  - Prize: **a trip for two to visit the site of the Virgo experiment**
- **Social network** activity
  - CNRS [Twitter](#) & [Facebook](#) accounts
- **Webcast to watch the event live from remote**
  - $\geq 300$  connections continuously

# Questions from the quizz

## 3) Un long voyage...

Combien de temps l'onde gravitationnelle détectée le 14 septembre 2015 a-t-elle voyagé ?

- A. Zéro seconde, car le temps est figé pour une onde gravitationnelle
- B. 13 années, à cause de la dilatation du temps à proximité d'un trou noir
- C. Un milliard d'années, quand elle a été générée les premiers organismes multicellulaires apparaissaient sur Terre
- D. 100 millions d'années, quand elle a été générée les dinosaures apparaissaient sur Terre



## 5) Un court voyage !

Combien de temps met le faisceau laser pour aller d'un bout à l'autre d'un bras du détecteur Virgo ?

- A. C'est instantané
- B. Une milliseconde
- C. Dix microsecondes
- D. Une nanoseconde



# What did not work...but definitely should have!

- **The H323 videoconference link between the participating sites**
  - Technical problem somewhere on the RENATER network
    - Not identified during the live event – nor afterwards in fact
  - In spite of the many practices organized during several weeks...
    - First for each individual site, then with several (but never all) sites connected
  - Identified since the beginning as the trickiest / less deterministic part of the event
    - Central technical coordinator
- **Live feed from the Virgo control room could not happen**
  - Replaced by a 6-minute movie about the first GW detection from CNRS Images
- **Switch to plan B instead**
  - Paris feed broadcasted everywhere for the quiz
  - Then all sites were asked to switch from RENATER to the webcast feed for the conference about science and cinema
    - Good quality signal but no interaction possible

# What may have worked better

- **The contests**

- Not many applications, especially for the scientific ones
  - More replies for the non-scientific ones – but of unequal quality
- With more preparation time, could have defined contests which would have better matched the teacher expectations
- Some high-schools from quite remote locations participated

- **Limited media coverage**

- More coverage to announce the event than to relate what actually happened
- But 2 national public radios and some regional newspapers
  - + partnership with the monthly « Ciel and Espace » magazine
- One article to be published soon in the SFP journal
- Pictures archived on the CNRS/IN2P3 photo library



# Lessons learned

- **Need a good topic**
  - Scientifically important and relatively easy to grasp for the general public
- **Implication and enthusiasm of the corresponding scientific community**
- **A light central structure and dedicated local teams**
  - Takes about 10 months to put together
  - Effort calibrated to the goal to achieve in each site
- **Small central budget** (~25 k€) from the main research institutes
- **Auto-financing of all local events** with money from Universities, clusters, etc.
- **Total budget about 70 k€**
  - Very good match between central CNRS team and SFP local antennas
- **Good mixture of science and fun**
- **Sites out of campuses are always a plus**
  - Cost more but rewarding
  - « Aim big, think big »
- **Social media mandatory to target young people / students**

# What next?

- **Resources developed to be reused** for two future (not-too-distant!?) event
  - Nobel prize
  - First gravitational wave detection including data from Virgo
- **« Nuit (...) »-like events organized regularly since 2010**
  - First was for ICHEP in Paris
- **More to come in the coming years**
  - With varying intensity and effort
  - Based on science news
- One suggestion: illustrate every year the Nobel prizes in physics
- **Extensions to other countries welcome**
  - One Italian site (Florence) for the « Nuit des Ondes Gravitationnelles »
  - Workarounds to be found to overcome the language barrier