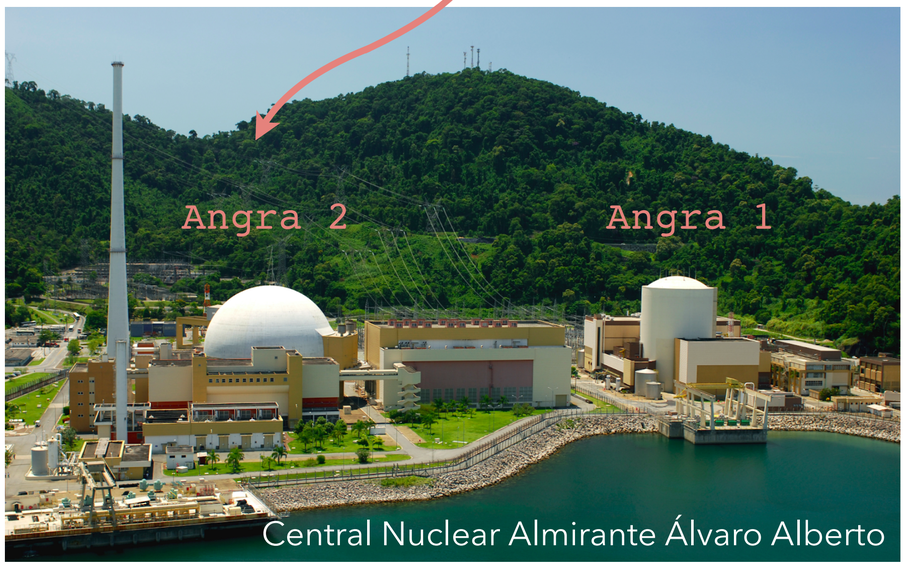
CONNIE

Coherent Neutrino-Nucleus Interaction Experiment

- Experimento @ 30 m del contro del reactor de Angra 2 de 3.9 GW
- Flujo: $\sim 10^{12}\ \bar{\nu}_e\ \mathrm{cm}^{-2}\ \mathrm{s}^{-1}$
- Periodos de Reactor-OFF (~1/14 meses) para mantenimiento



Central Nuclear Almirante Álvaro Alberto

Colaboración Internacional

ICAS-ICIFI-UNSAM
DF-UBA
IB-CAB
IFEG-CCT CORDOBA
UNS

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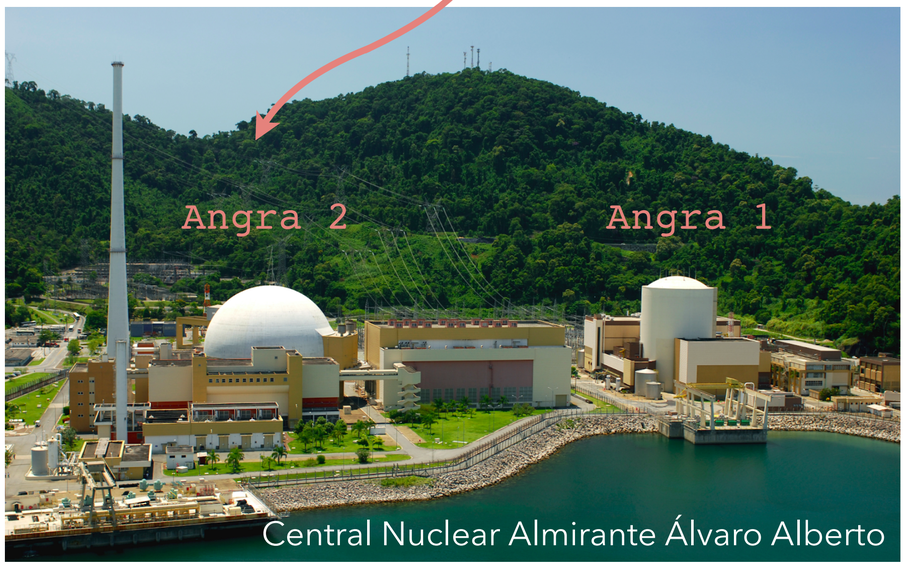

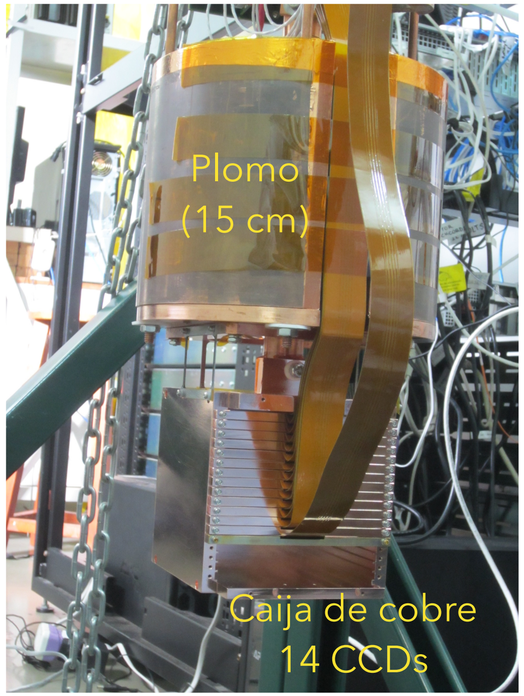

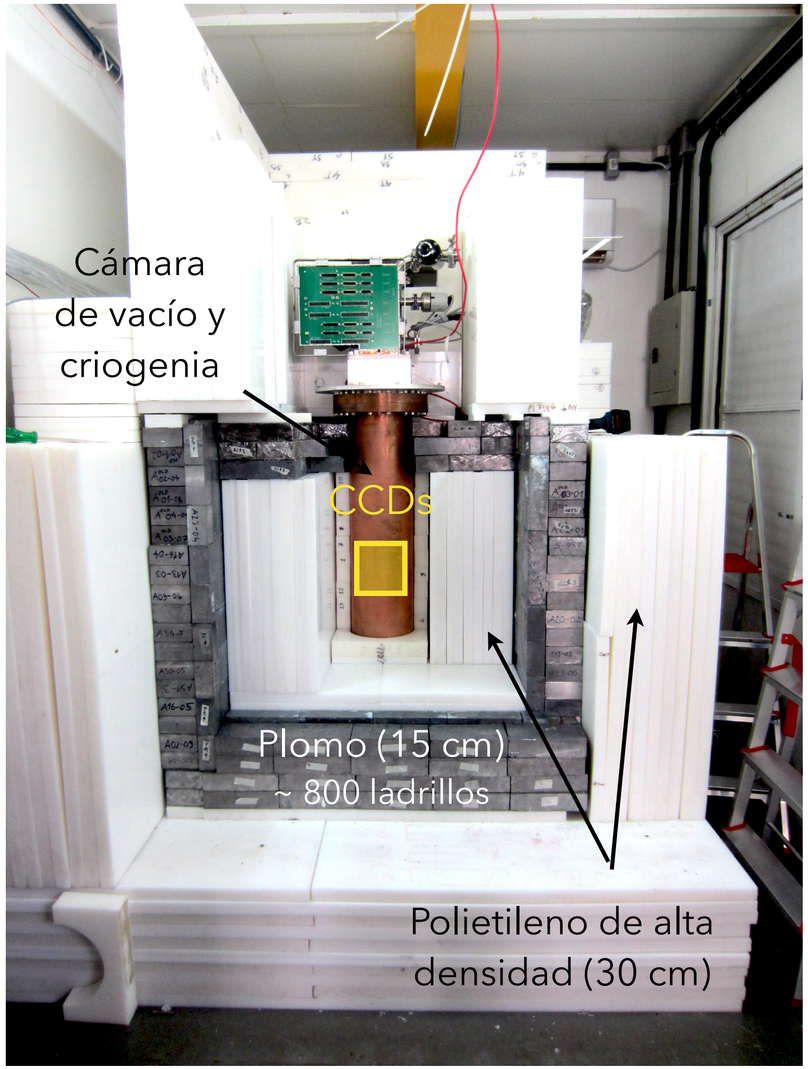

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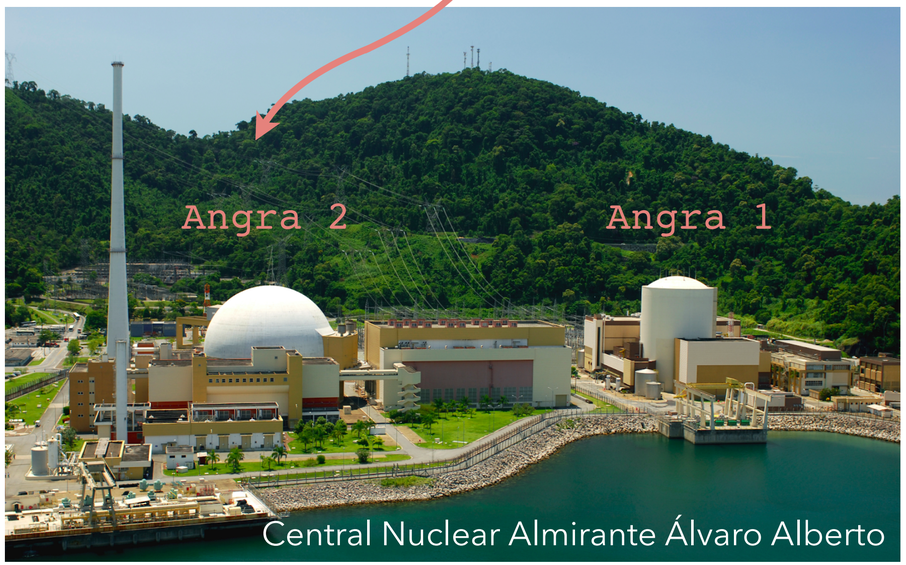

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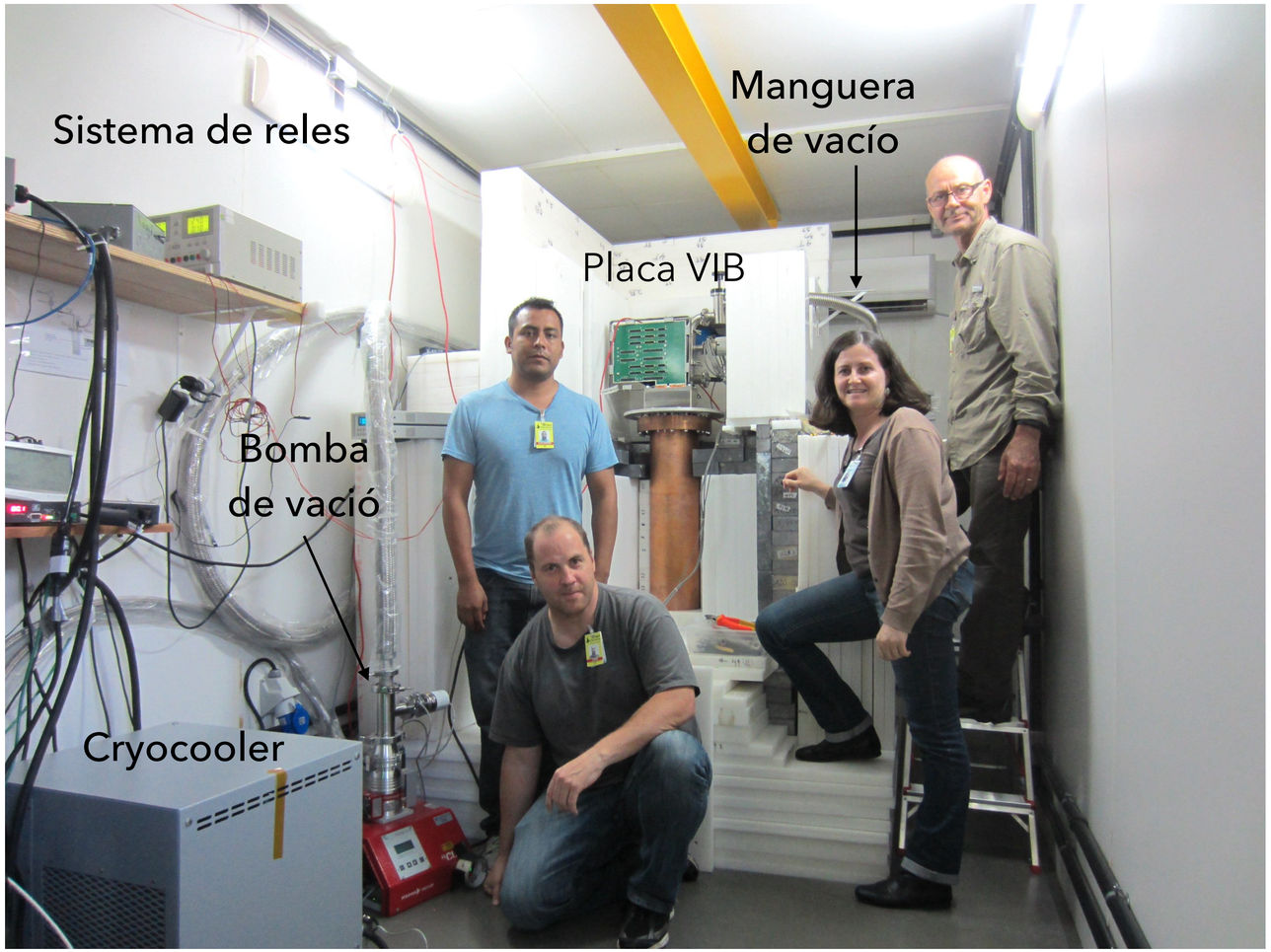
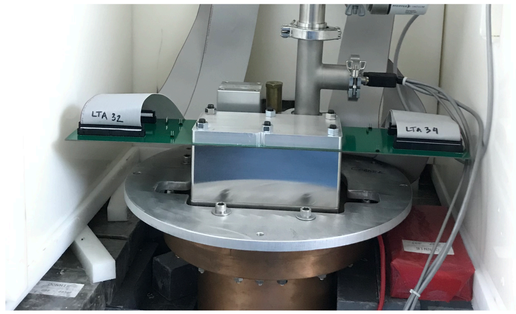
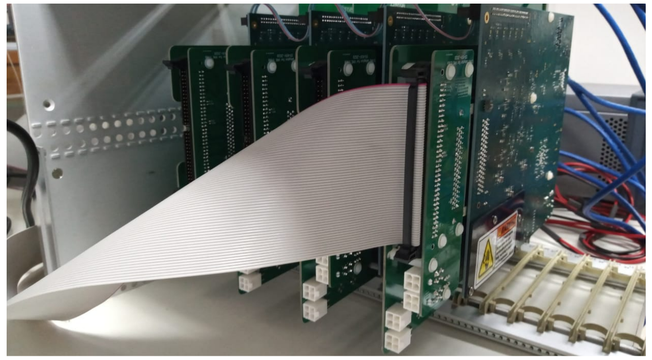
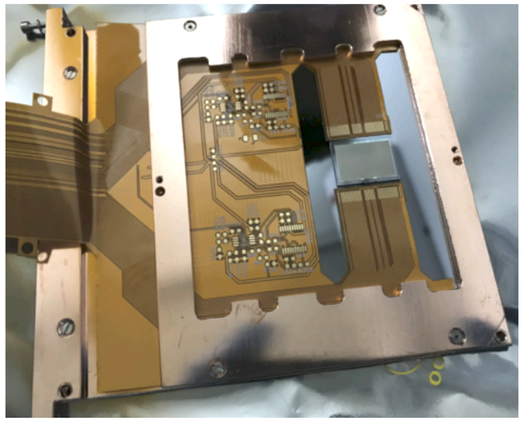


Skipper-CCD @ CONNIE

- Skipper-CCDs instaladas en Junio de 2021
- Novo limite de detección ~ 15 eV
- Mejor entendimiento del *background*
- Etapa intermedia para el diseño y construcción de la próxima generación de experimentos







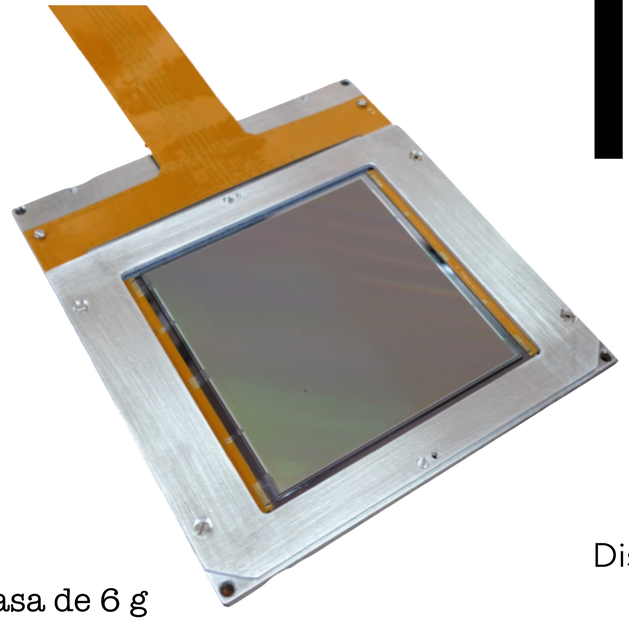
Más informaciones:
Carla Bonifazi
cbonifazi@unsam.edu.ar

CCDs

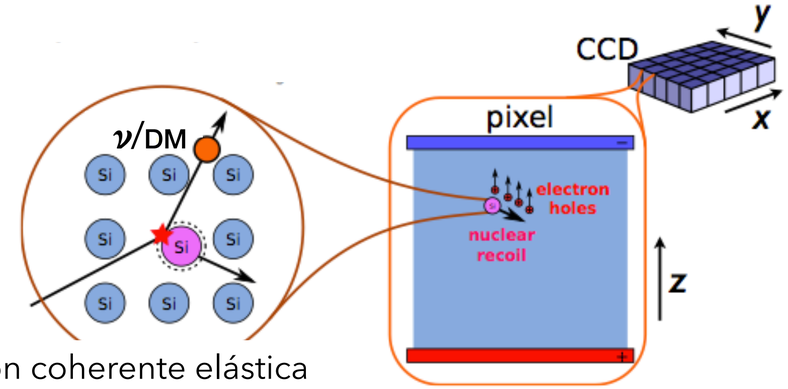
Charge-Coupled Devices

- Inicialmente utilizadas como sensores para hacer imagenes (telescópios)
- Ahora también como detectores de partículas (DAMIC, SENSEI & CONNIE)

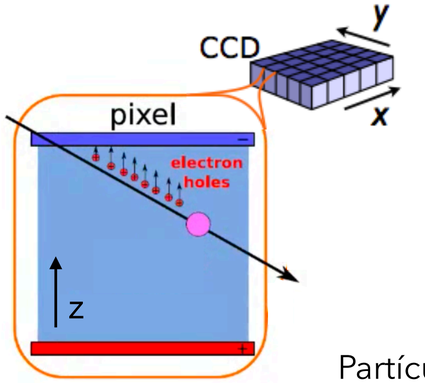
Detectar la interacción coherente con el núcleo de silicio (Si) mediante la medición de la ionización producida por el retroceso nuclear.



masa de 6 g
675 μm de espesura
16 Mpix de 15 μm x 15 μm
desarrolladas el el Lawrence Berkeley National Laboratory MicroSystems Lab



Dispersión coherente elástica



Partícula Ionizante

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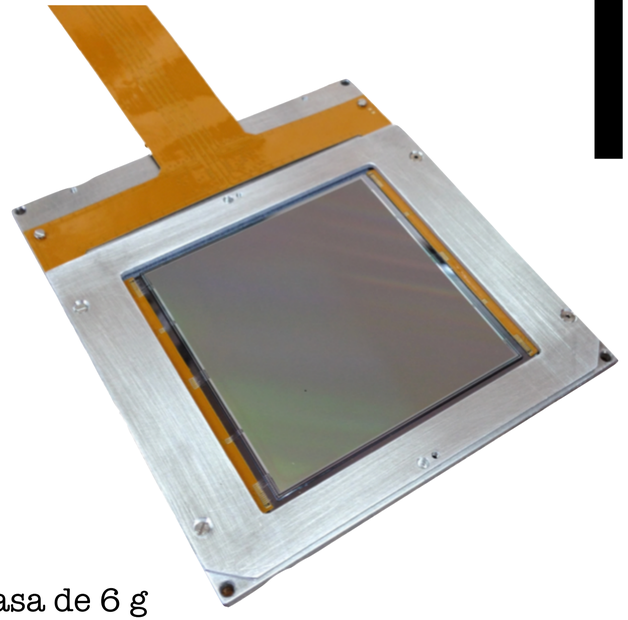

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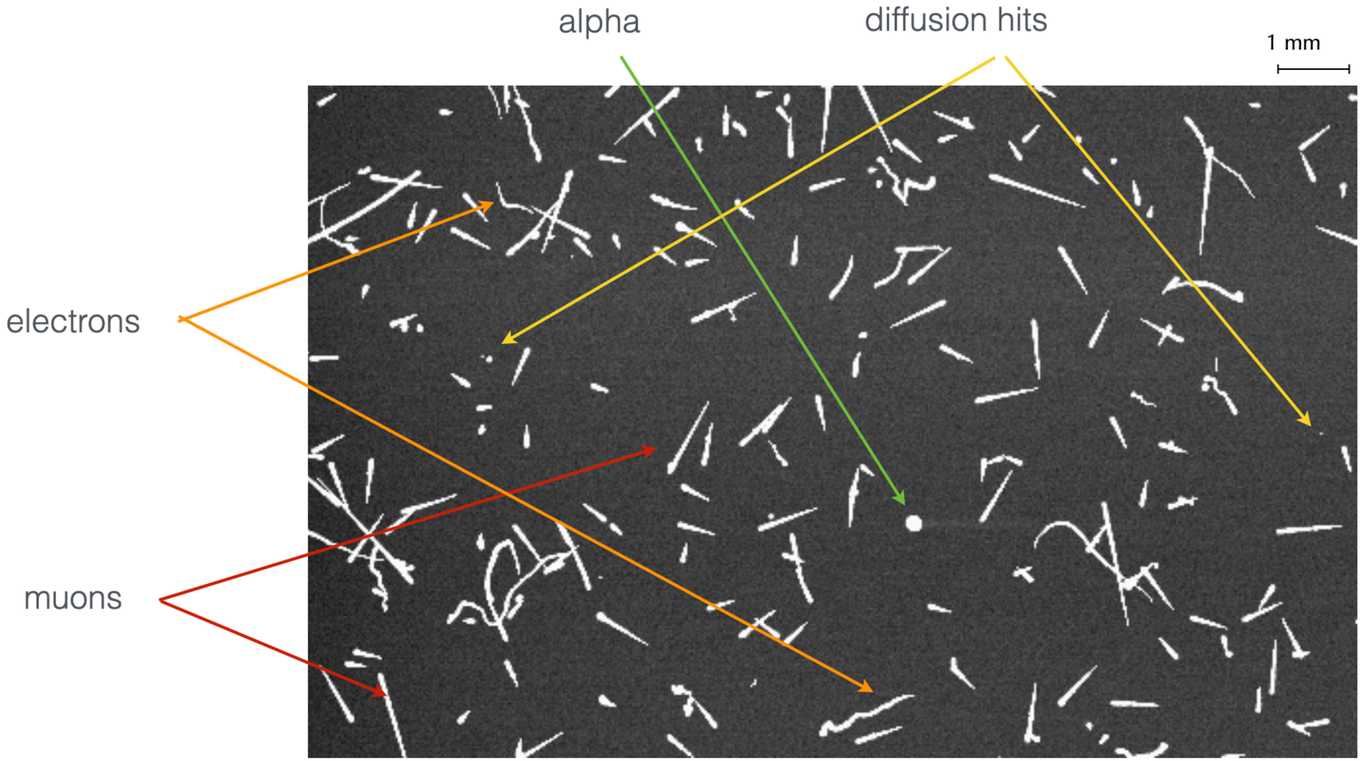

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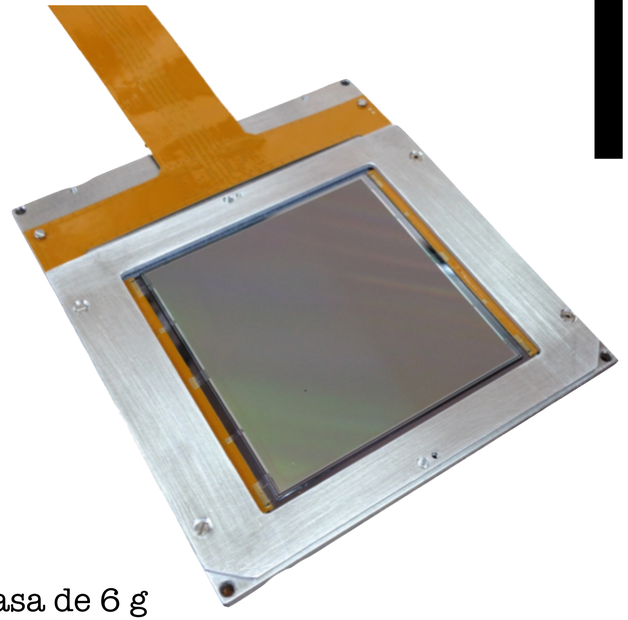

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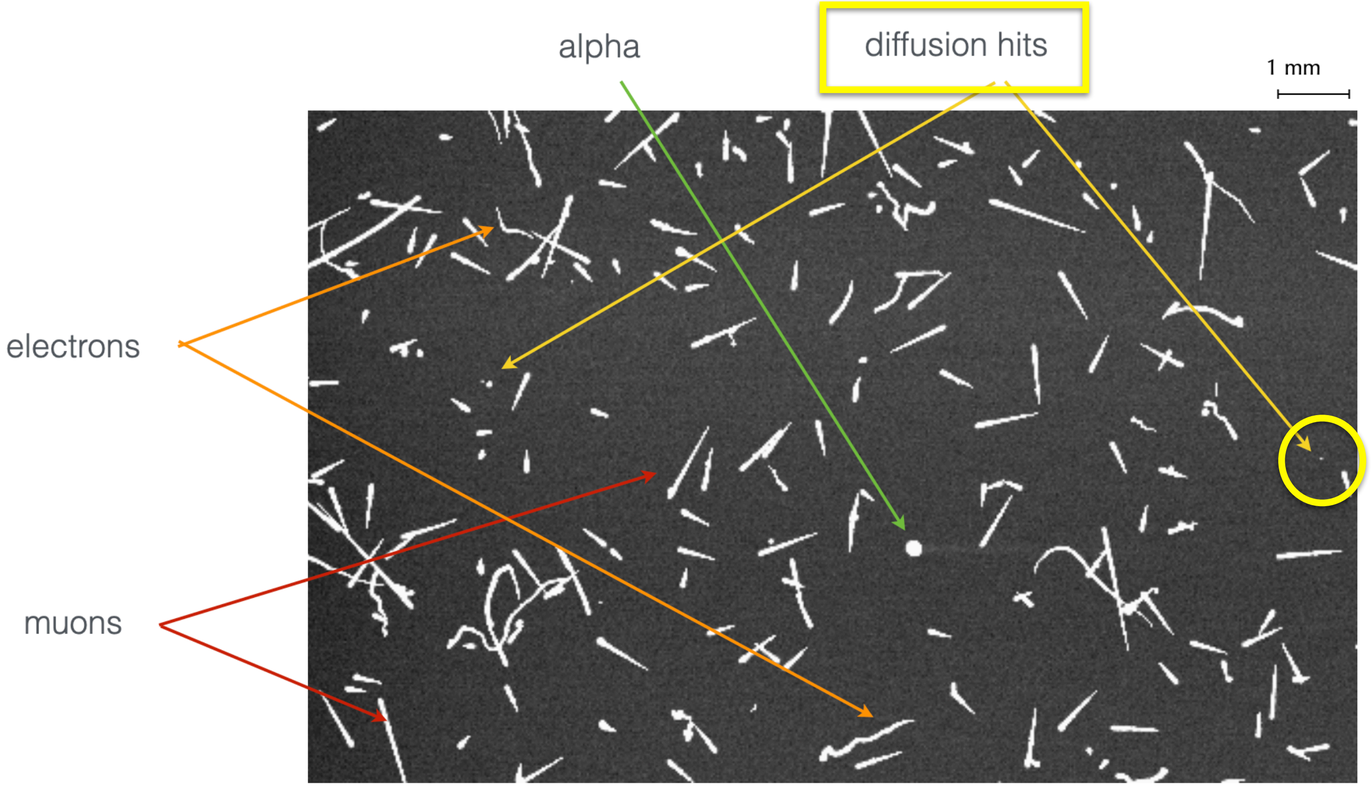

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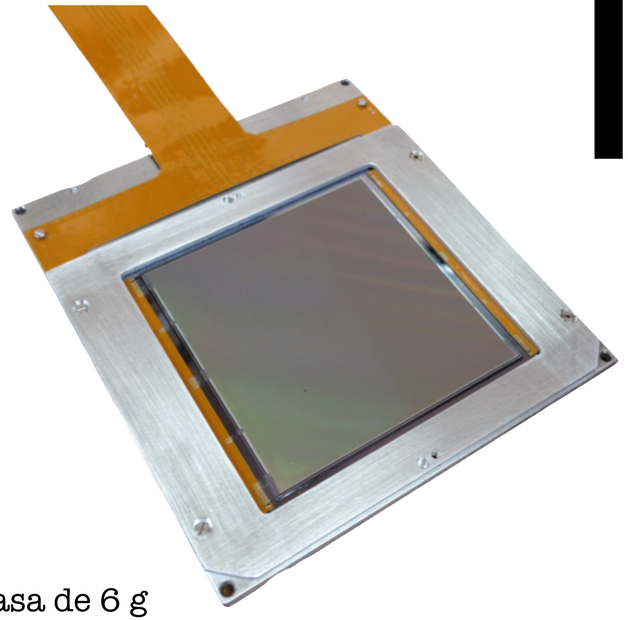

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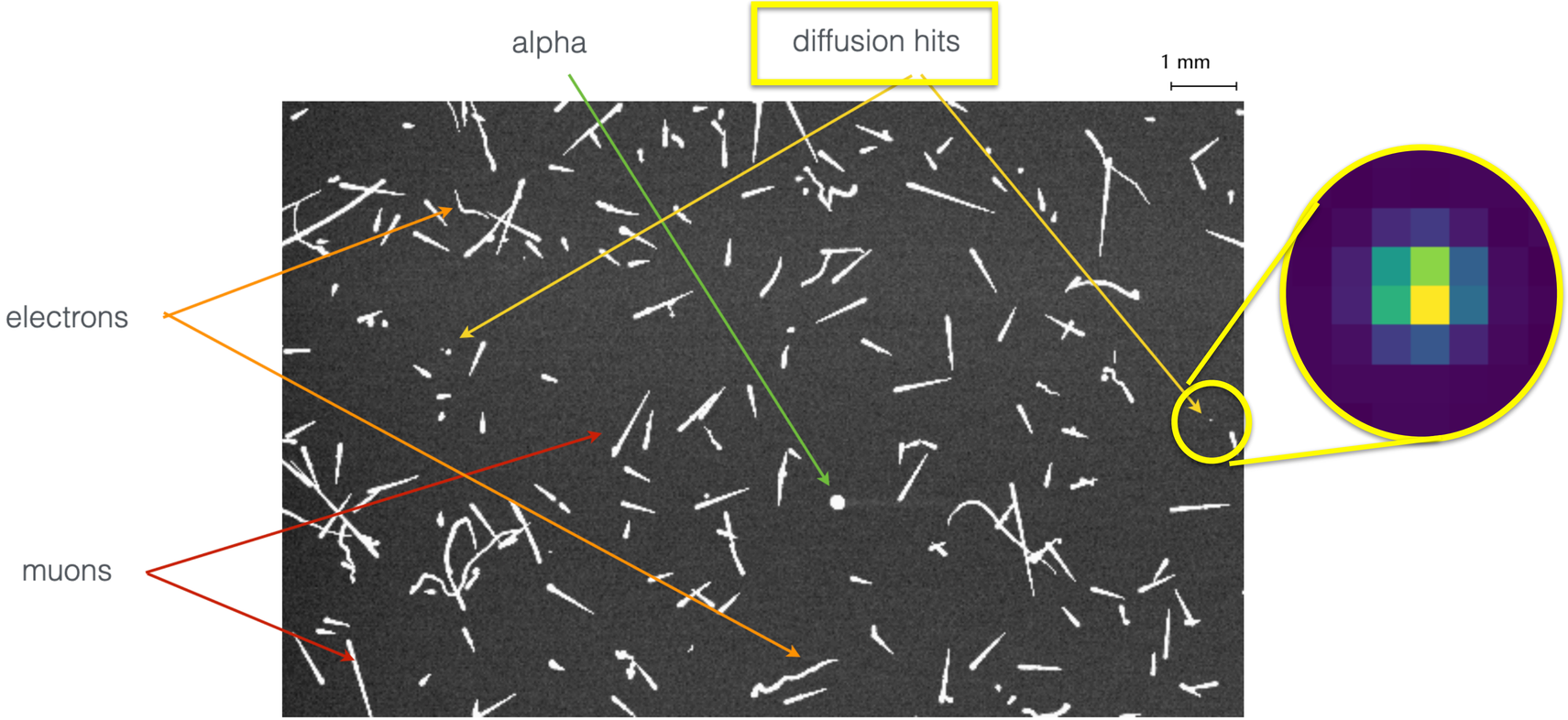

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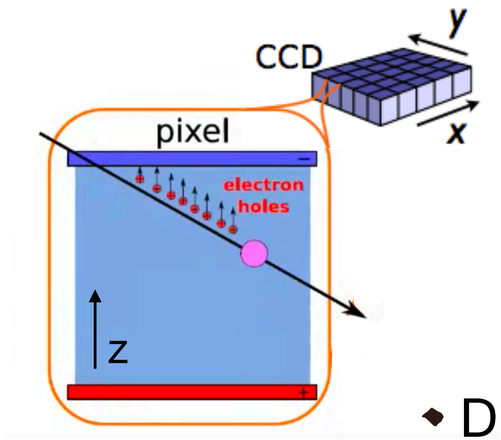

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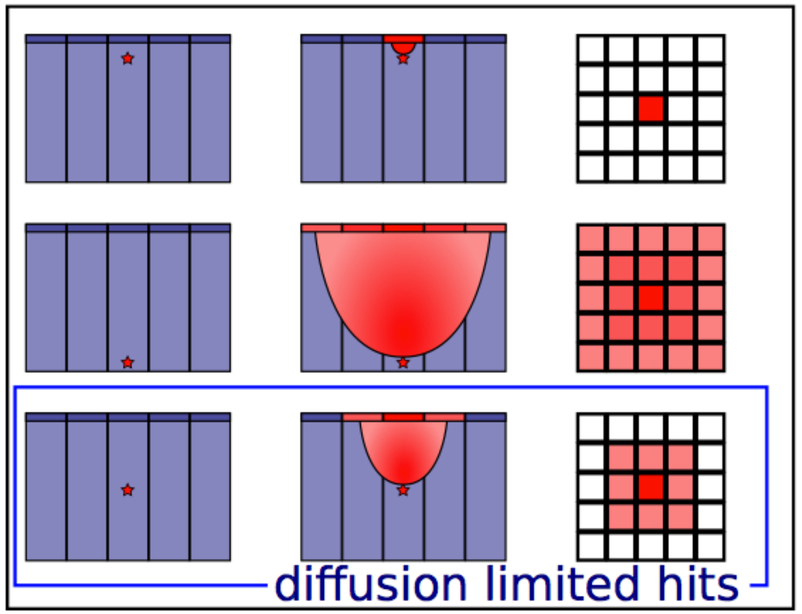
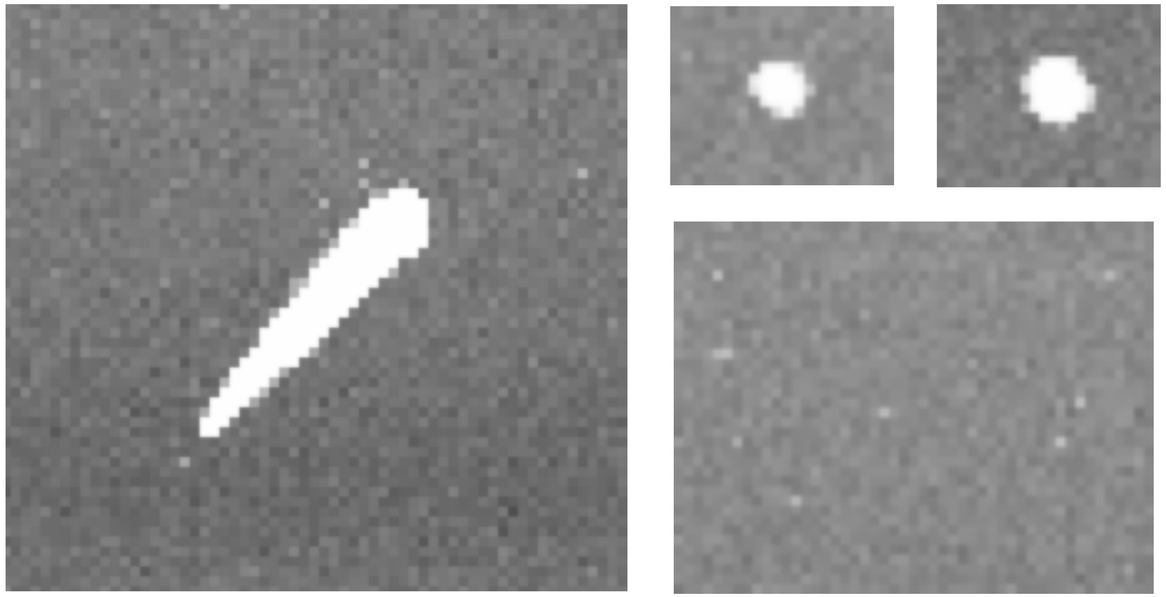
- Difusión nos dá la posibilidad de reconstrucción en 3D

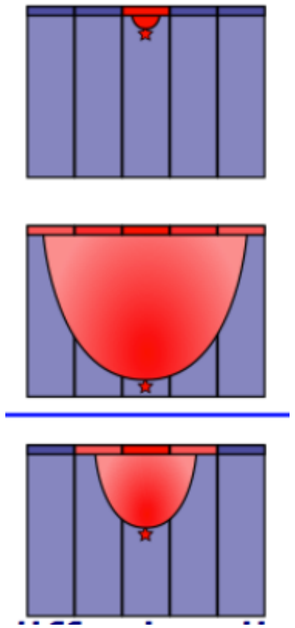


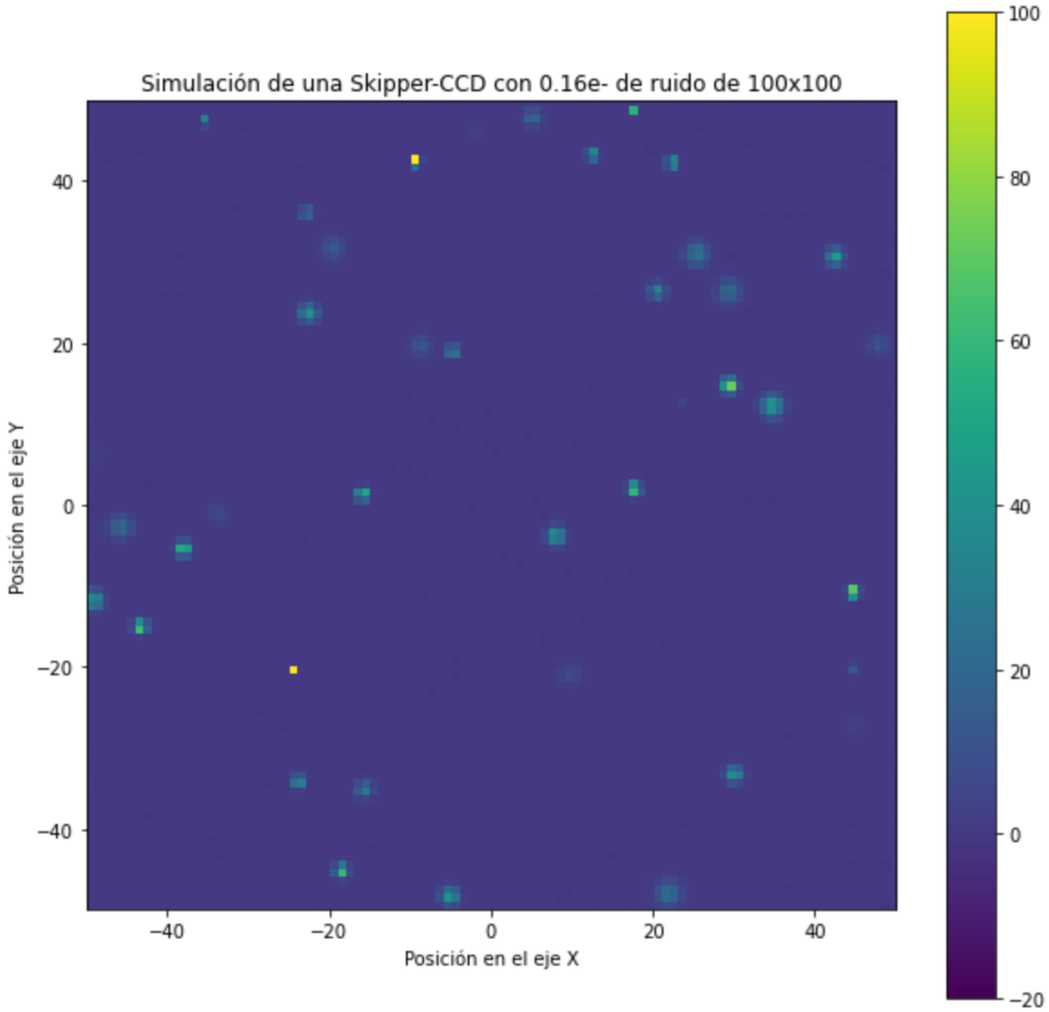


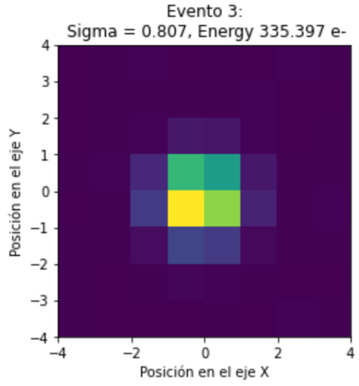
Challenge

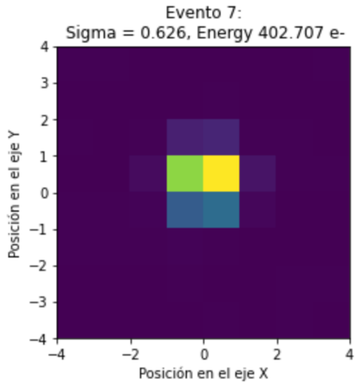
Encontrar a partir de la imagen la profundidad a la que se generó el evento

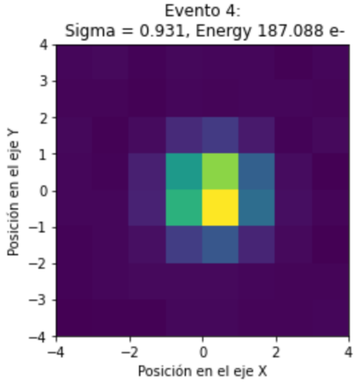
Observable: sigma

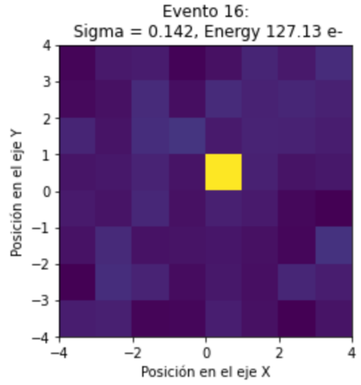


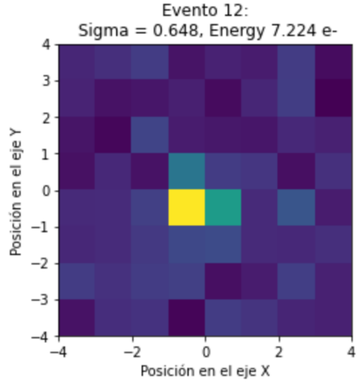












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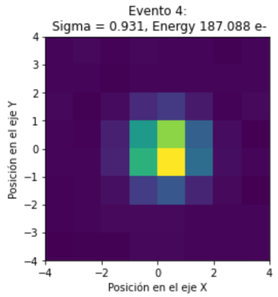

Informaciones:

- Eventos: simEvents_100k.txt
  matriz de 8x8 que contiene el evento


```
evento,pixDist
0,-0.1368767996703146 9,-0.03197427267635523,-0.2183090039561845 8,-0.04122982970815764 6,-0.17990034470984761,0.172011785632482 7,0.1634701448359807 7,0.1570875342648364 6,0.06781402106
694559,-0.105392981069876 2,-0.1303963408783637 7,-0.08689168858113798,0.1029663463729516 3,0.3068517453384852 5,0.2180571108992333 5,0.188327008840873,-0.1350913002871637 3,-0.128244434
62574345,-0.001715562822706 0737,1.0627966843995142,0.546635949100186 6,-0.07397343480364177,-0.046664624560351,-0.04690413902540959 6,0.0009734720675968158,0.5352225979309825,7.41026
8905808269,46.64774029402863,18.400686611862863,0.5525890570878362,0.2443786433847097,0.49069134619449817,0.18813499869113345,0.251721508926167,21.820618735732264,137.4481417612247
5,55.05944624911002,1.3061712398161718,0.07763139364341147,0.06153721143013251,-0.05838698516758527,-0.13409044737105918,4.147868283882899,25.909635307682972,10.35974023736403,0.34
85427559778013,0.2033921380883873 3,0.10068705995452315,0.1556679016899235 6,0.02455348773244614 4,0.12692981726114447,0.36068643016442403,0.07178435438648943,-0.20068339179630498,-0.
014622046901912423,-0.08508238375945663,-0.2010910297644204 2,-0.2831498498041991 6,-0.02006462700719751,0.23061599859877838,0.09205427149907085,0.03660507261135775,0.048513540884083
39,-0.1226024035333435 2
```


- Informaciones: simInput_100k.txt


```
evento,mean_x,mean_y,z,sigma,escale
0,-0.3802936872845539,0.4490496604032524 5,385.4395888807636,0.6885820331330951,432.1641720682964
1,0.11505607862260092,0.18096046452923475,180.68027253504292,0.43843182839119915,334.59786801175915
2,-0.10733862964835372,-0.23403315109356726,485.34203905695836,0.8071668762045558,335.3966550810203
3,0.33830492993246886,-0.13842038503694887,582.811790788589,0.9305300304780069,187.08781064034235
4,0.3759406928358099,0.4339366374955693,265.0381566495852,0.5459303765678544,53.889808383715376
5,-0.4144418170319234,0.18609538135726522,182.2887075590791,0.44060116777889047,218.30455008743357
6,0.06534923505071066,0.35695356919181676,332.12112364922314,0.6260498293030999,402.70696840197513
7,0.44751506140154174,-0.08660277443530418,126.16959309789063,0.36034222055012527,288.60650904897585
```