

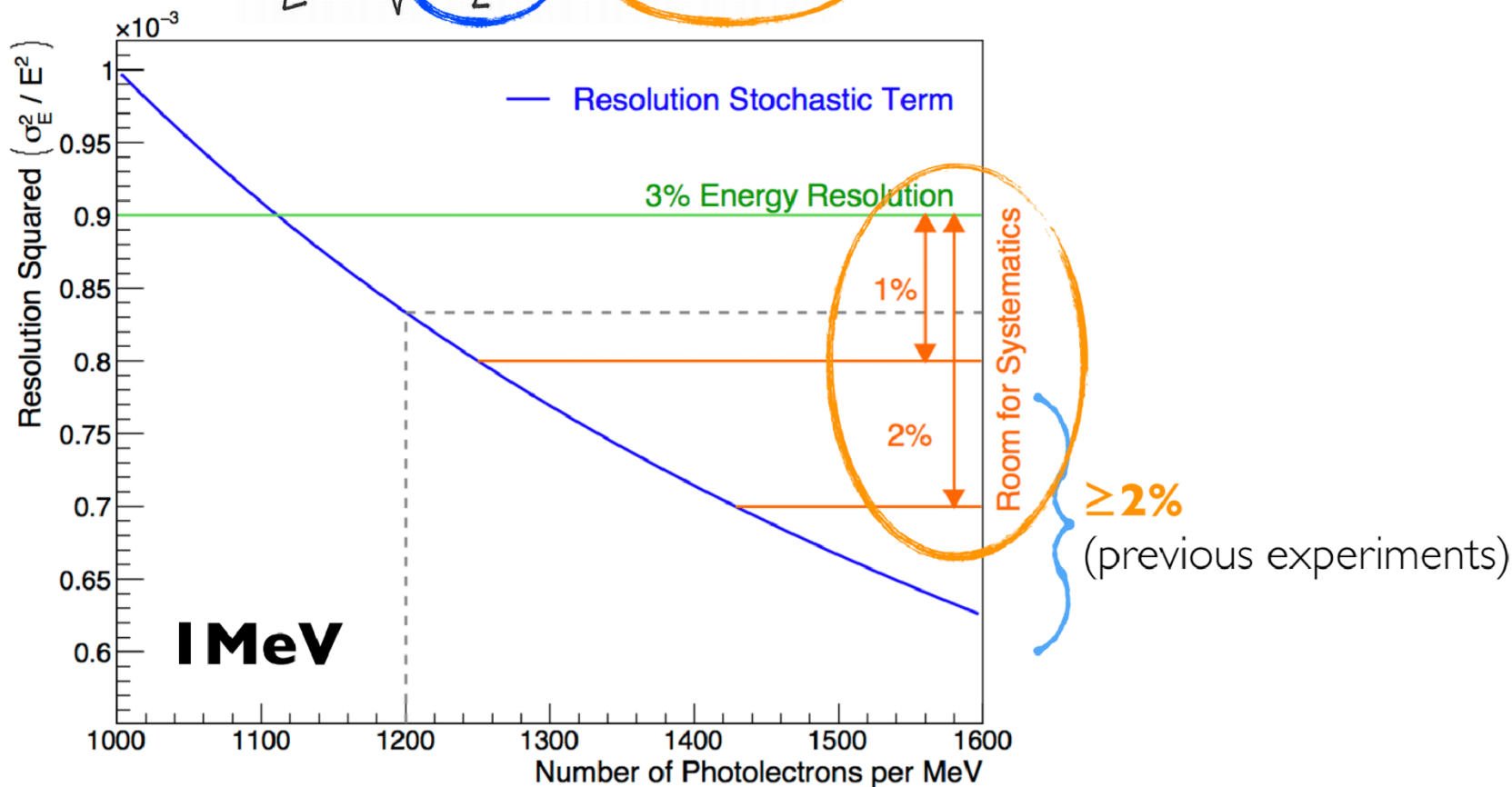
# The SPMT system

C.Cerna

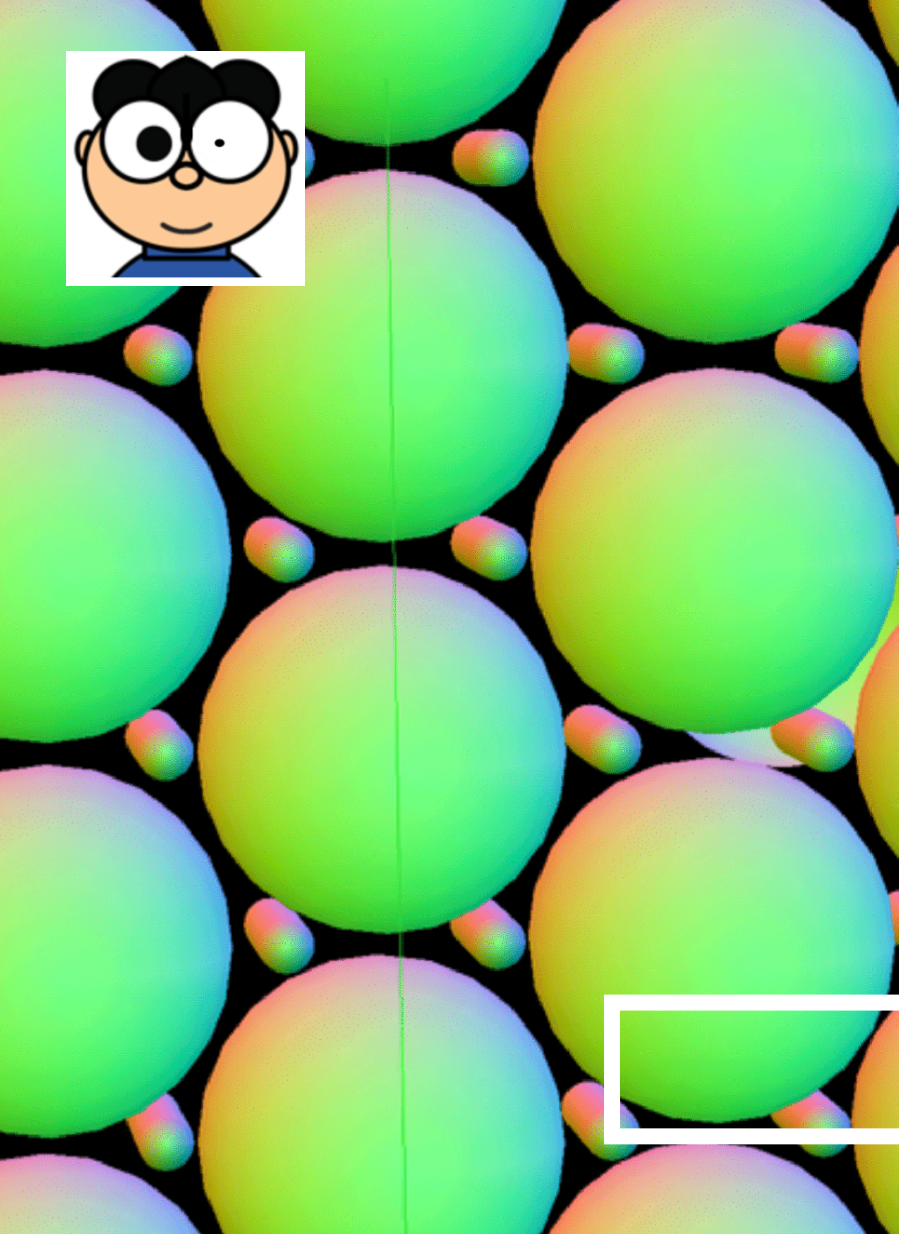
On behalf of the JUNO SPMT team

**lot of light** is a necessary but not sufficient condition

$$\frac{\sigma(E)}{E} = \sqrt{\frac{\sigma_{\text{STOCH}}^2}{E} + \sigma_{\text{NON-STOCH}}^2(E)} \leq 3\% \text{ @ } 1 \text{ MeV}$$

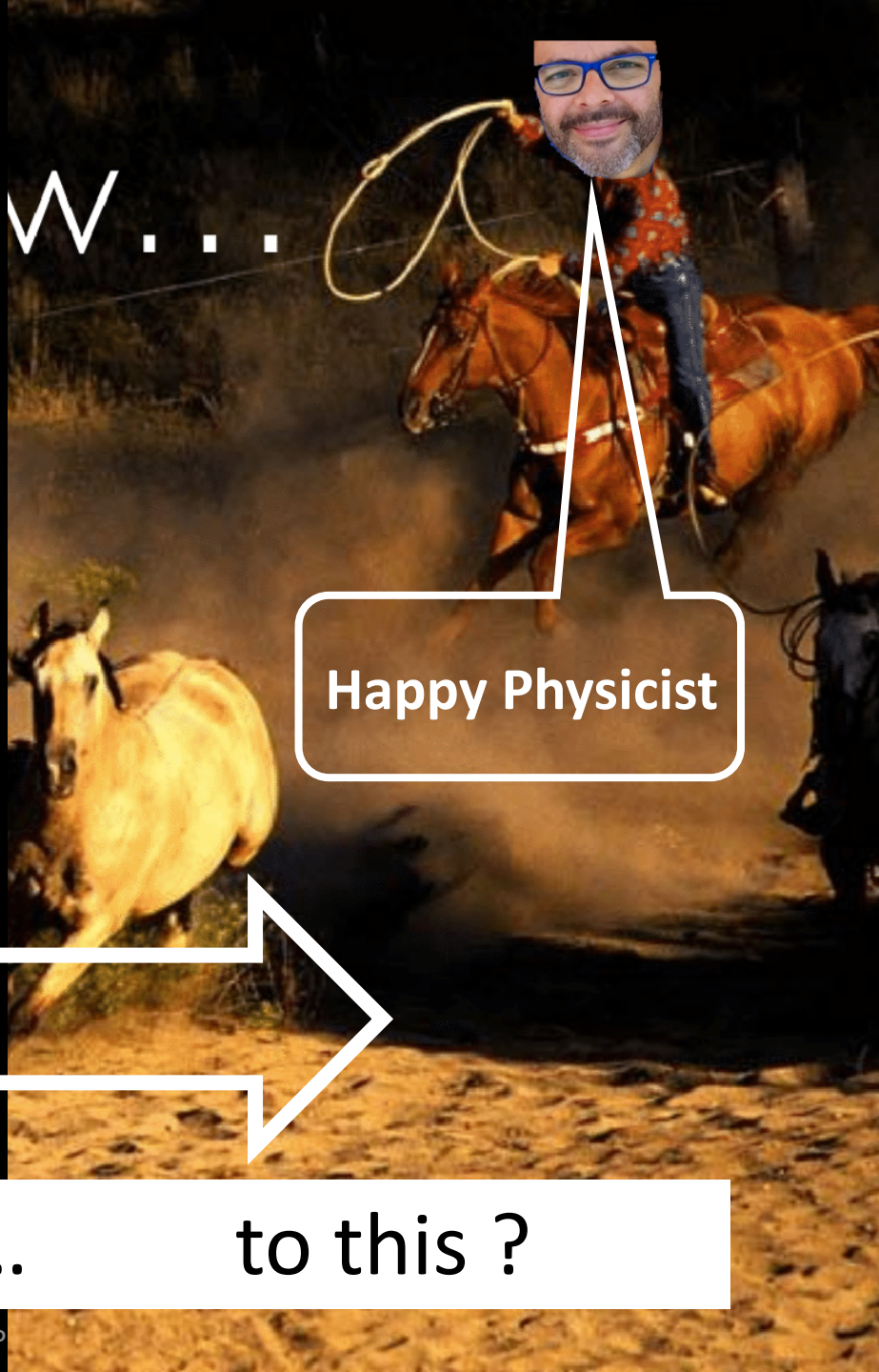


**challenging calorimetry systematics control**



W . . .

Happy Physicist



How to get from this...

to this ?

You need a **system** (readout, mechanical, etc.)

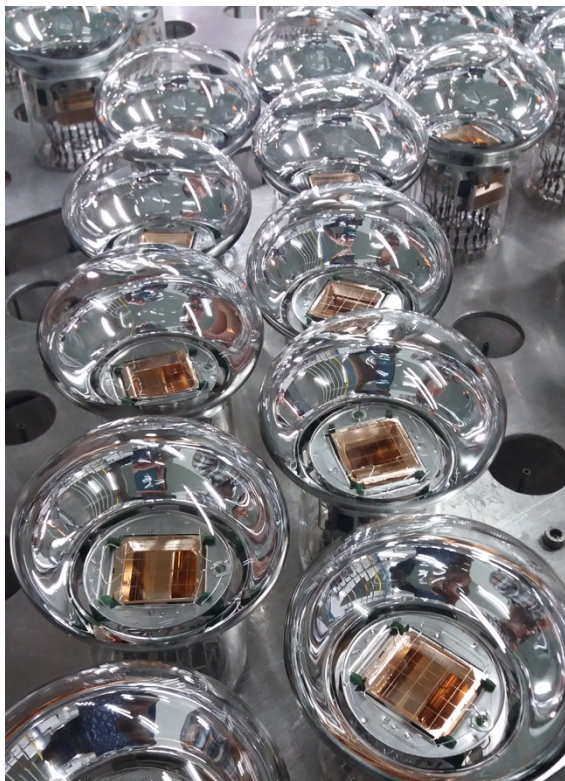
- Existing in industry  
or that could be developed in your time scale
- You can build and implement
- Affordable



# The smart path....

## 3" PMT

- Existing in industry
- Affordable
- Good single photon counting system



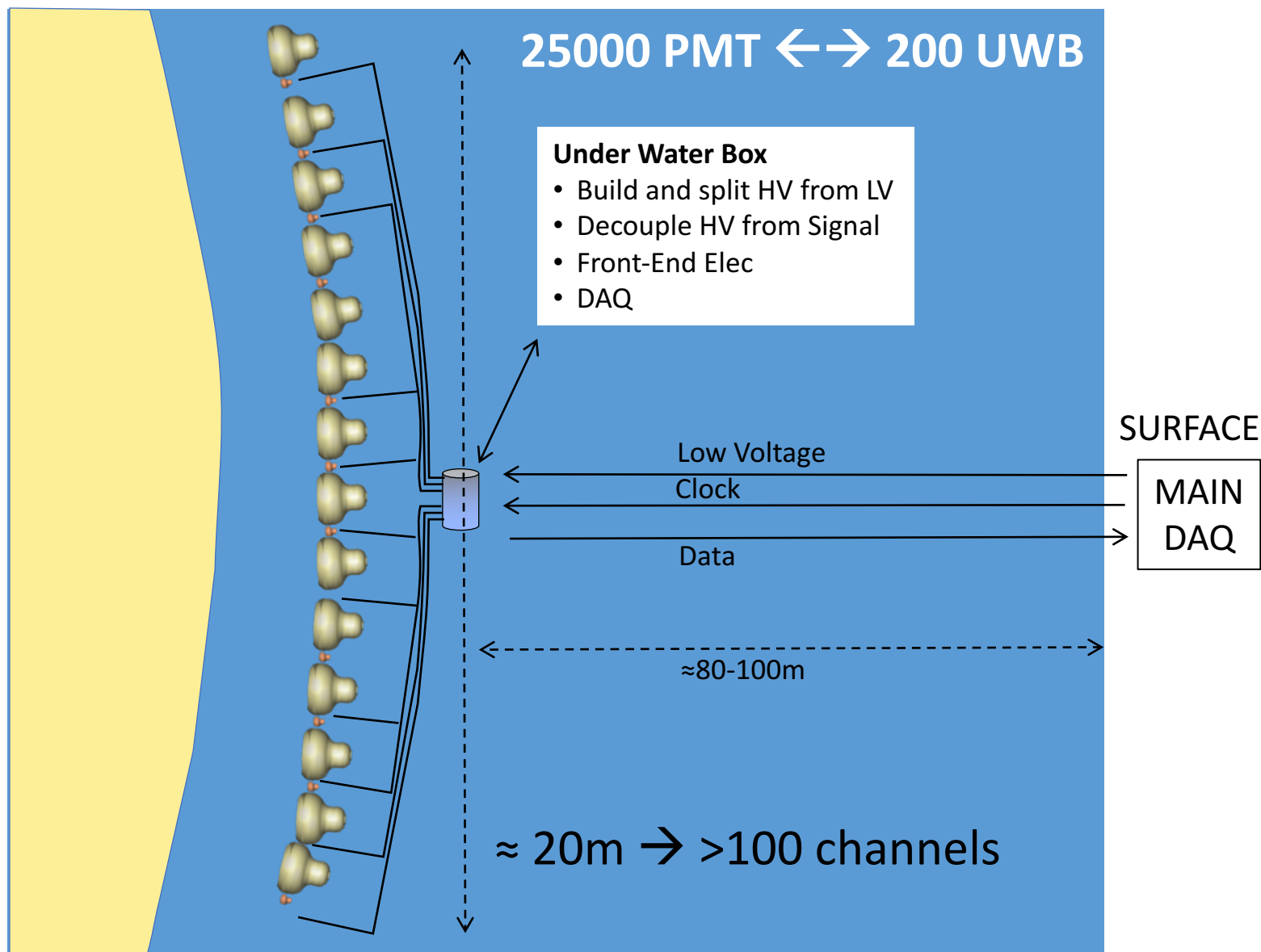
## CATIROC ASIC

- Existing in french lab
- Affordable
- Good single photo-electron readout system



From Large Water Cerenkov  
to Large Liquid Scintillator

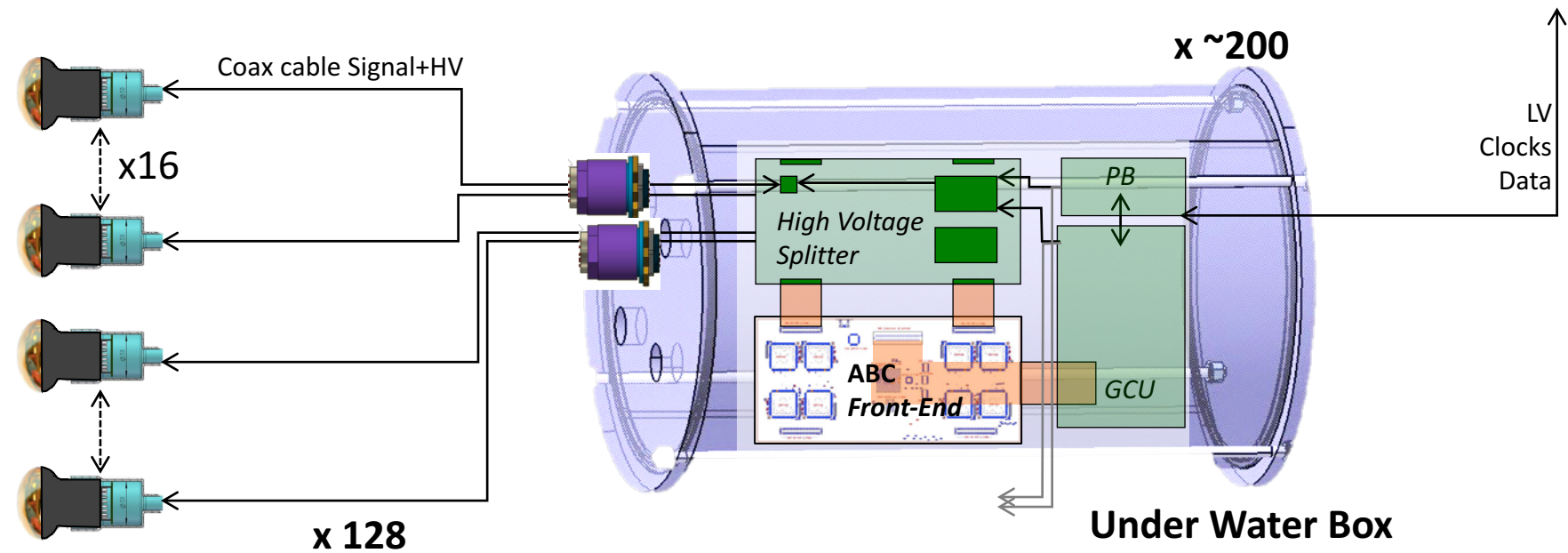
# SPMT system sketch



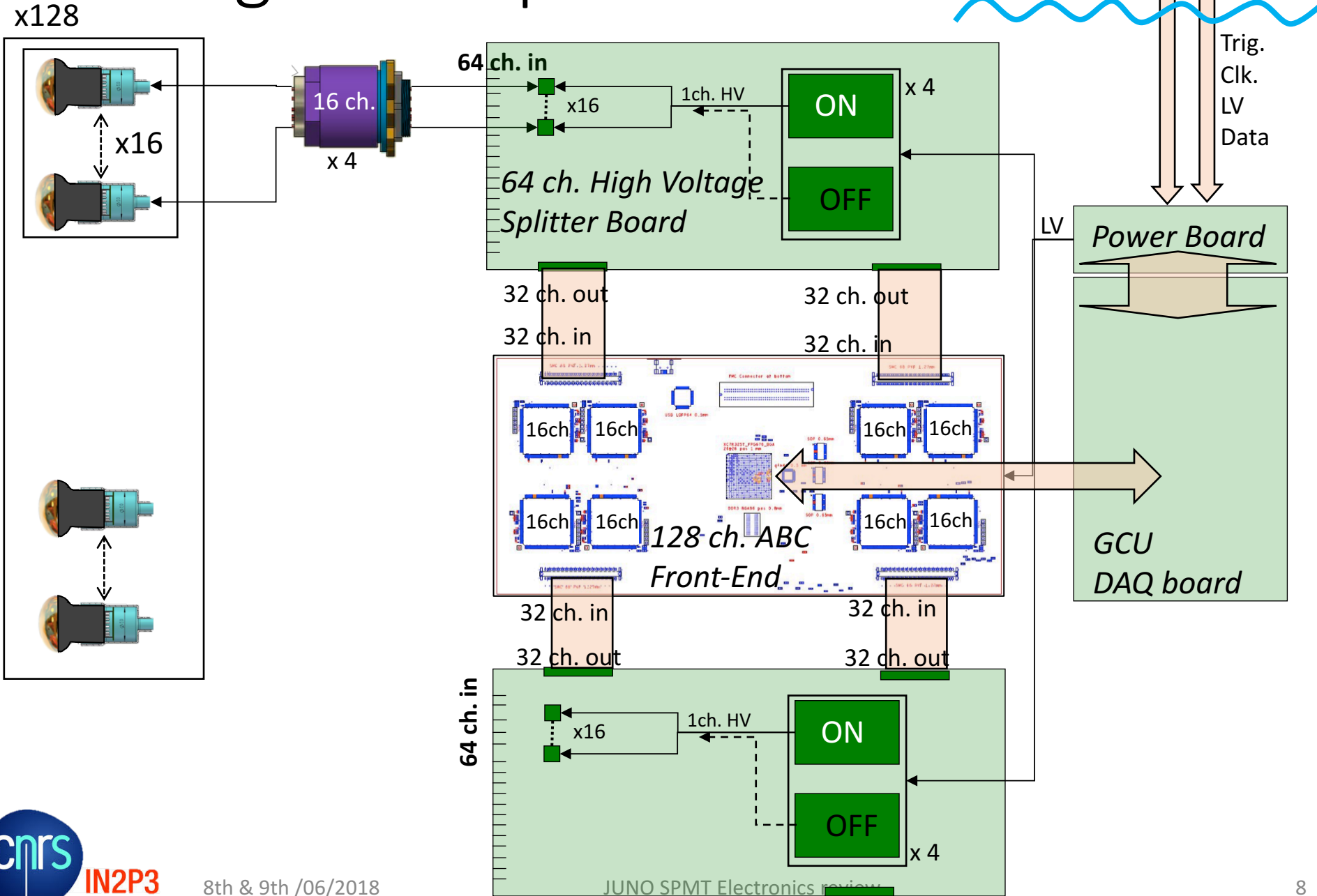
# System schematics

our construction brick

- 3" PMT
- High Voltage divider
- Potting
- Cable
- Connector
- Under Water Box
- ABC board
- Splitter board



# Being more specific










# Organization

*Successful management system*

## PIs

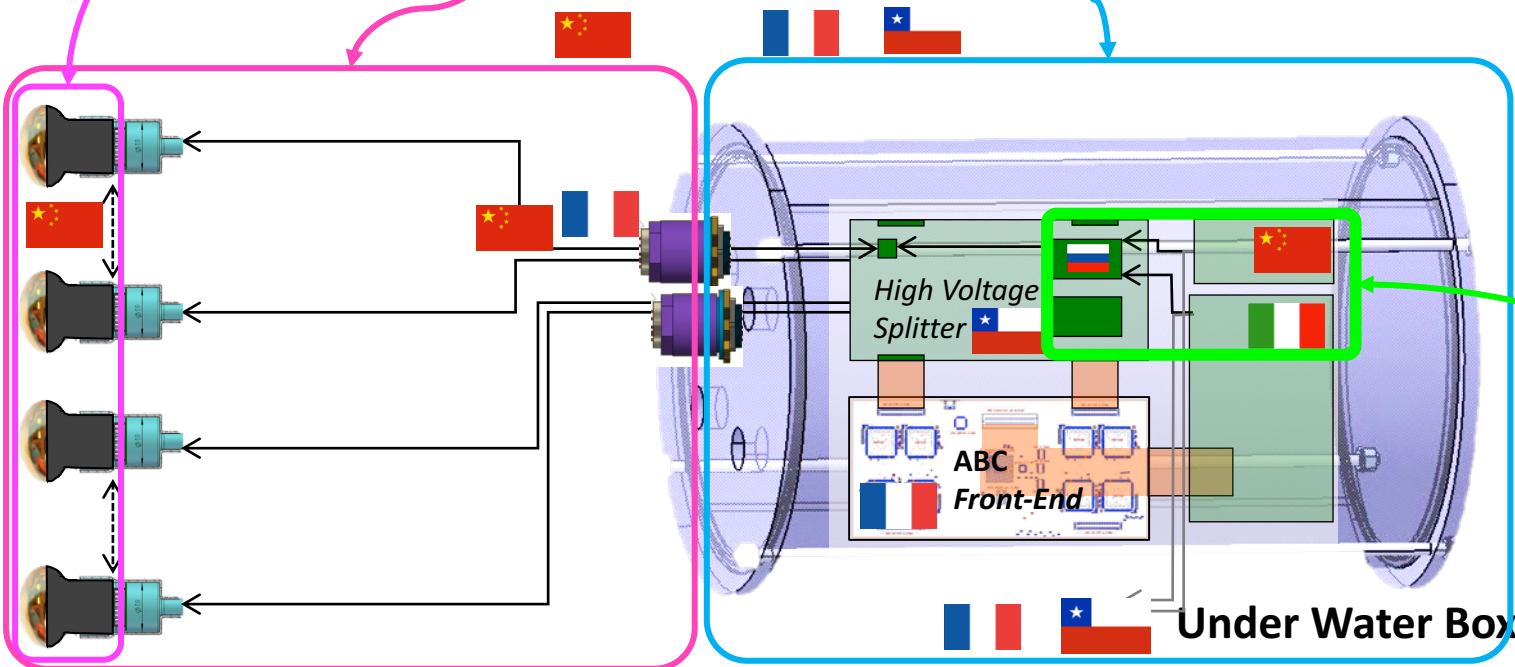
- A.Cabrera (APC) 
- P.Ochoa (PUC) 
- M.He (IHEP) 

25 000 PMT

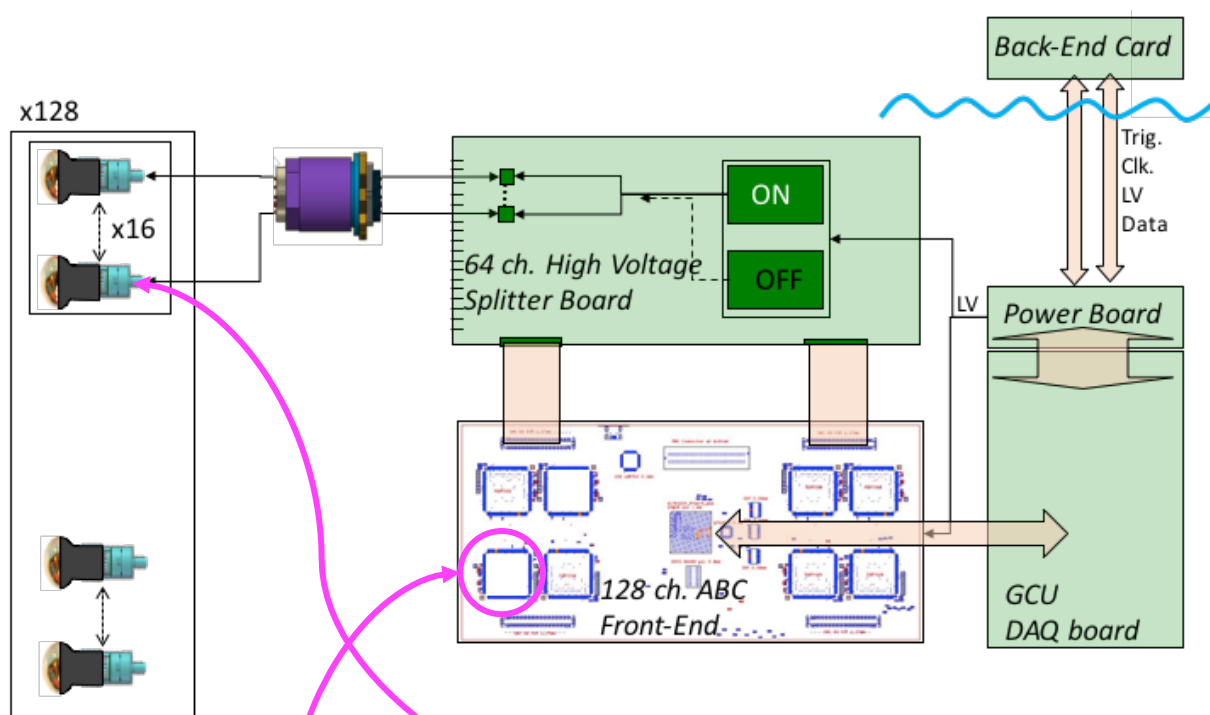
Already in production

Front instrumentation  
In production in 2018

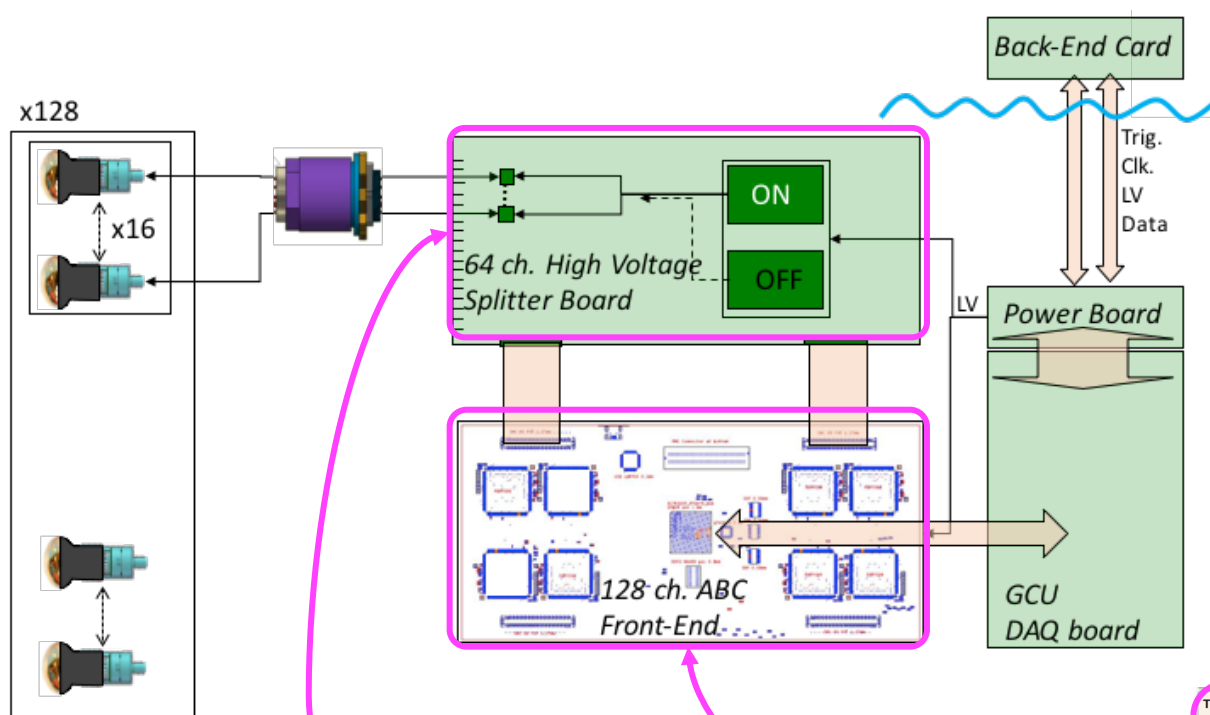
In production in 2019



Already JUNO

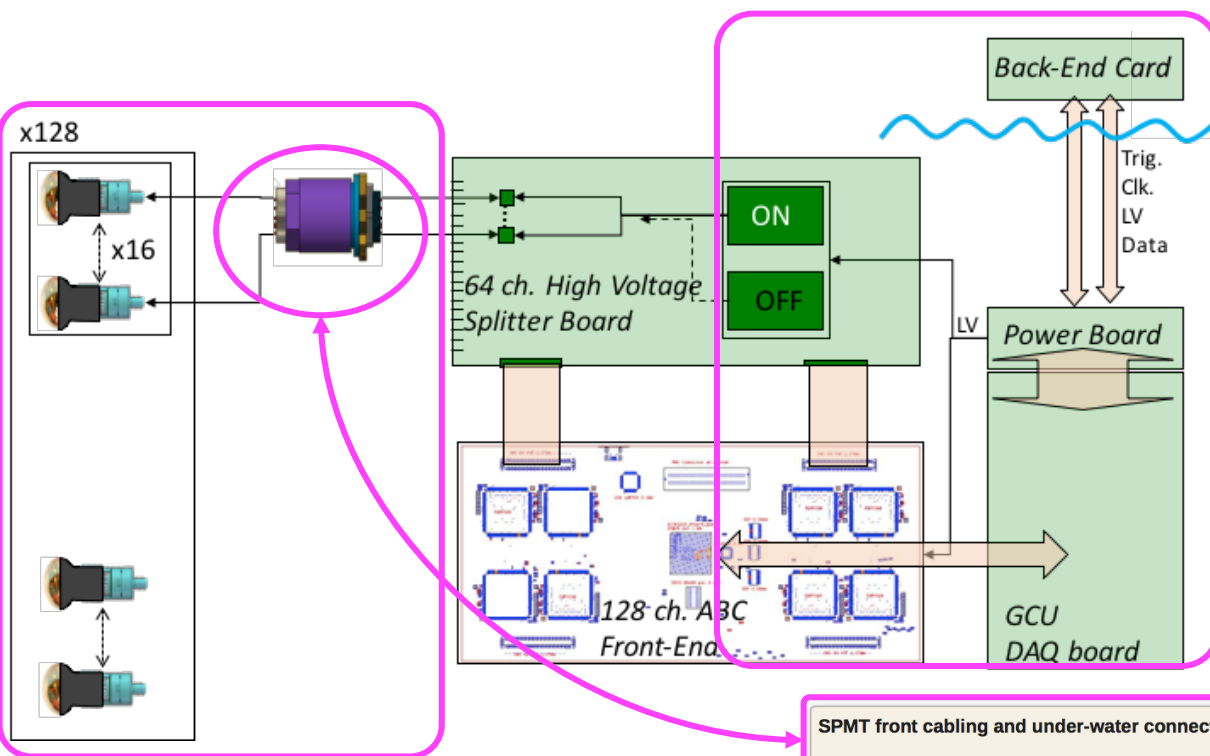


<b>3" PMT and High Voltage divider status</b>	Prof. Miao He
Bordeaux	10:50 - 11:05
<b>Coffee break</b>	
Bordeaux	11:05 - 11:20
<b>The CATIROC ASIC circuit</b>	Selma Conforti
Bordeaux	11:20 - 11:40
<b>CATIROC performances for JUNO</b>	Anatael Cabrera
Bordeaux	11:40 - 12:00
<b>CATIROC production plan</b>	Selma Conforti
Bordeaux	12:00 - 12:10



<b>The ABC readout board introduction</b>	Cayetano Santos
Bordeaux	13:45 - 14:00
<b>ABC Version V0 Hardware description</b>	Abdelkader Rebil
Bordeaux	14:00 - 14:25
<b>Firmware</b>	Cayetano Santos
Bordeaux	14:25 - 14:45
<b>ABC test bench</b>	Frédéric Druilleole
Bordeaux	14:45 - 15:05
<b>ABC V0 preliminary results</b>	Frédéric Druilleole
Bordeaux	15:05 - 15:25
<b>Coffee Break</b>	
Bordeaux	15:25 - 15:45
<b>The ABC V1 evolution</b>	Frédéric Druilleole
Bordeaux	15:45 - 16:00
<b>ABC Production</b>	Frédéric Druilleole
Bordeaux	16:00 - 16:20
<b>HV Splitter board presentation</b>	Pablo Walker
Bordeaux	16:20 - 16:40
<b>CENBG visit around JUNO contributions</b>	





**SPMT front cabling and under-water connector**

*Bordeaux*

*Cédric Cerna*

09:30 - 09:50

**PMT acceptance test bench DAQ systems**

*Bordeaux*

*Guillaume Vanroyen*

09:50 - 10:10

**SPMT electronics schedule**

*Bordeaux*

*Cédric Cerna*

10:10 - 10:30

**Coffee Break**

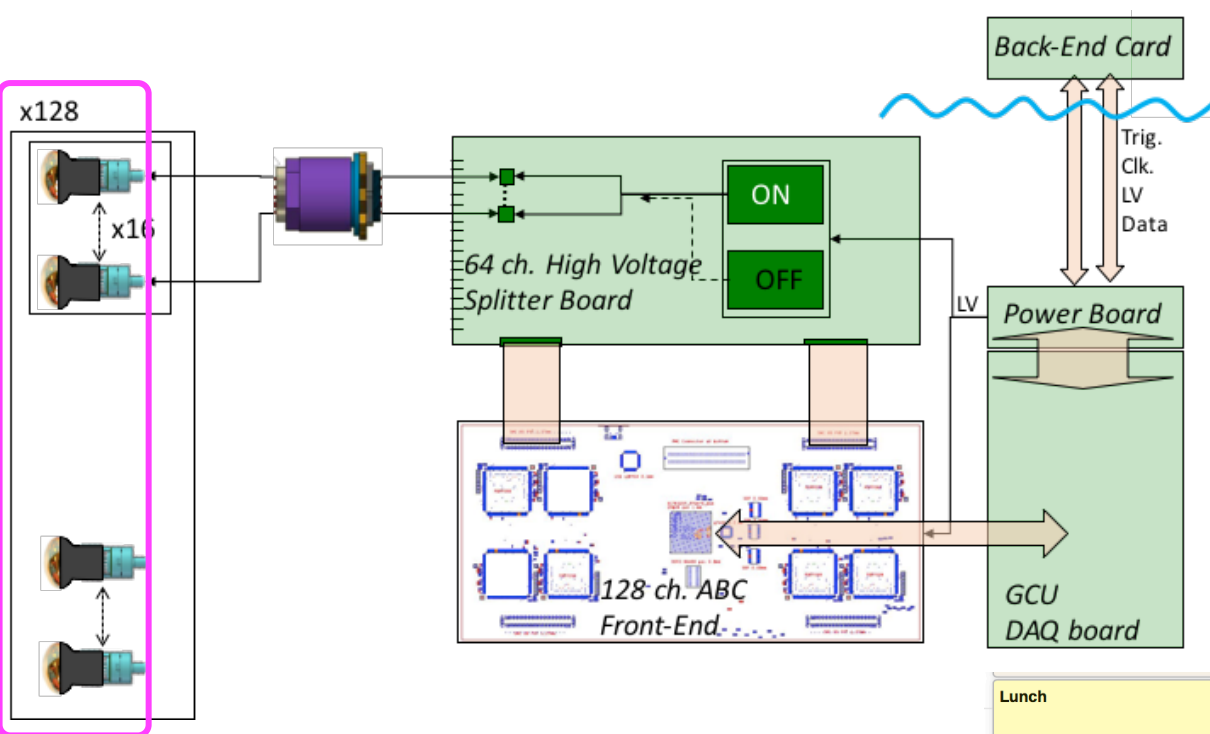
*Bordeaux*

10:30 - 10:50

**Round Table discussion**

*Bordeaux*

10:50 - 11:50



Lunch

Bordeaux

11:50 - 13:20

Feedback from the reviewers

Bordeaux

13:30 - 14:15

3<sup>rd</sup> PMT test sytem status

Nan Li

Bordeaux

14:15 - 14:35

3<sup>rd</sup> PMT status of production

Jilei Xu

Bordeaux

14:35 - 14:55

