

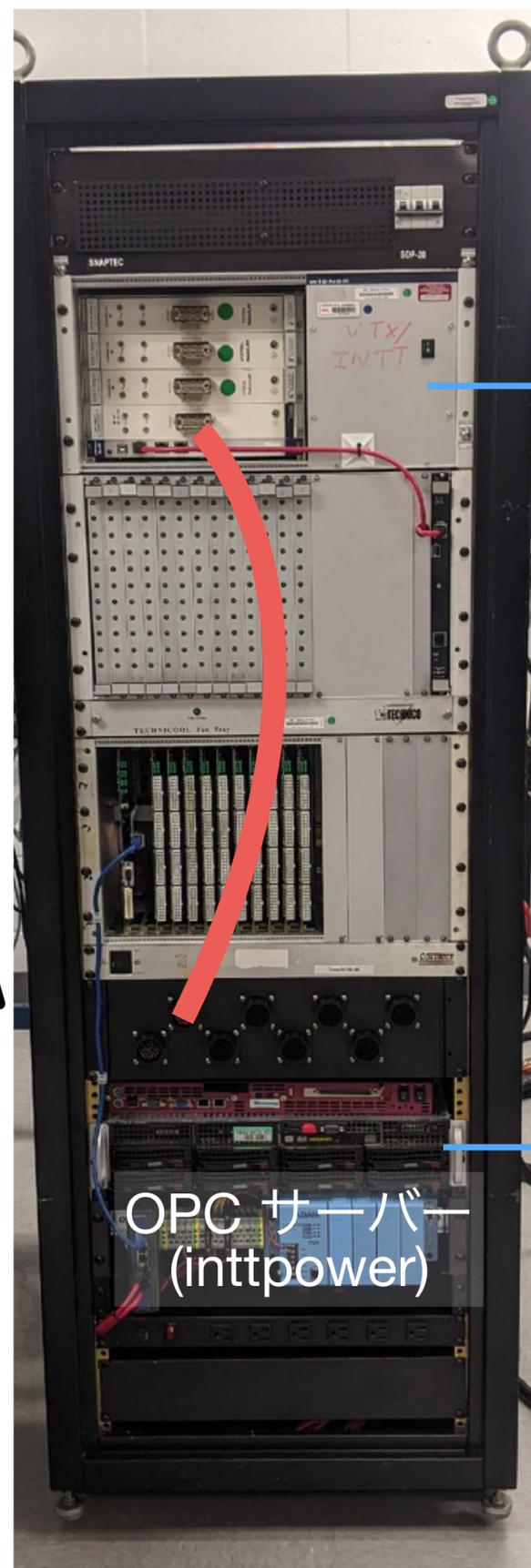
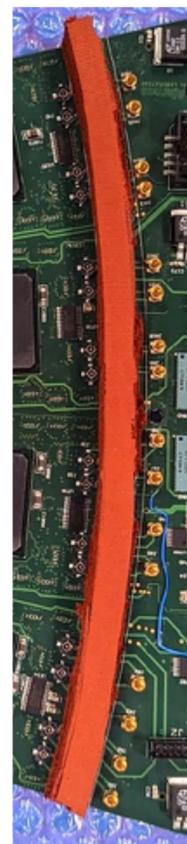
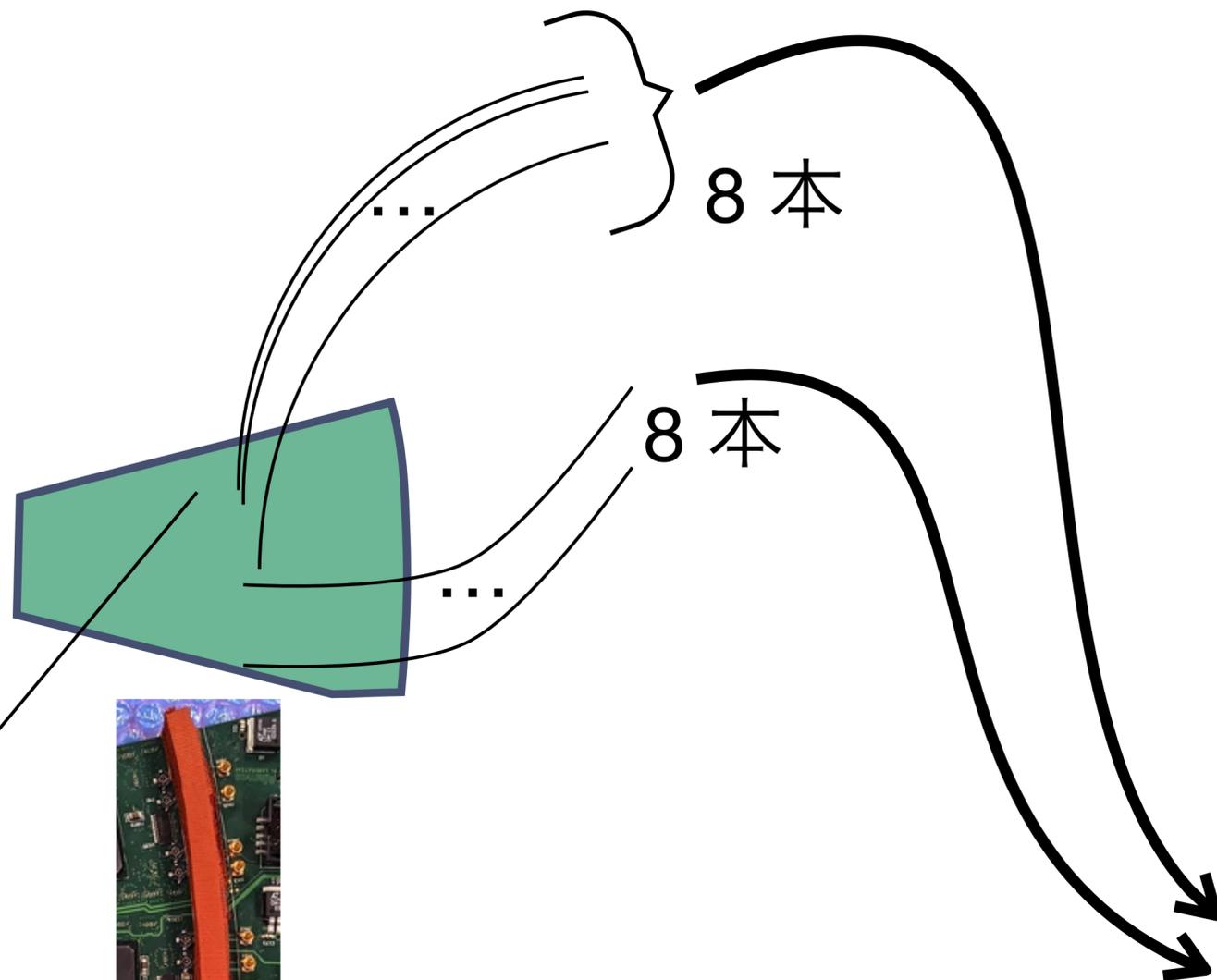
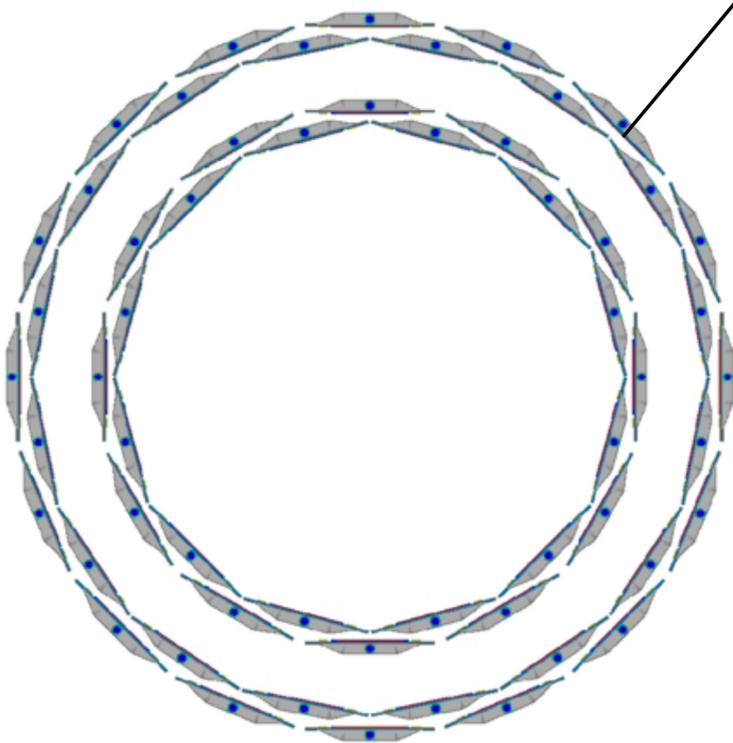
H_{igh} V_{oltage} 操作用

G_{raphical} U_{ser} I_{nterface} の開発状況

糠塚元気 (RBRC)

スペシャルサンクス
若田真来, 今井皓

INTT の HV



OPC サーバー
(inttpower)

HV GUI アプリでやりたいこと

- HV の ON/OFF
 - 全チャンネル
 - ROC 単位
 - ラダー単位
 - ラダーの type-A, type-B ごと
- HV 操作の設定
 - 印加電圧
 - 最大許容電圧値, 電流値の設定
 - 電圧変化のスピード設定
- HV の監視
 - チャンネルごとの電圧値, 電流値
 - グラフによる可視化
- オペレーションの記録？
 - 操作の時刻と内容
 - 電圧値, 電流値の記録

HV GUI アプリを作るにあたって

LV は sPHENIX 全体で共通のフレームワーク（ツール？） Ignition designer を使っている
HV の操作は Simple Network Management Protocol で行うが、

 Boose, Stephen <boose@bnl.gov>       
宛先: Genki Nukazuka
Cc: shimomuramaya <maya@cc.nara-wu.ac.jp>; mai watanabe <wcm_watanabe@cc.nara-wu.ac.jp> 他 1 人
2023/01/31 (火) 11:46

Hi Genki,

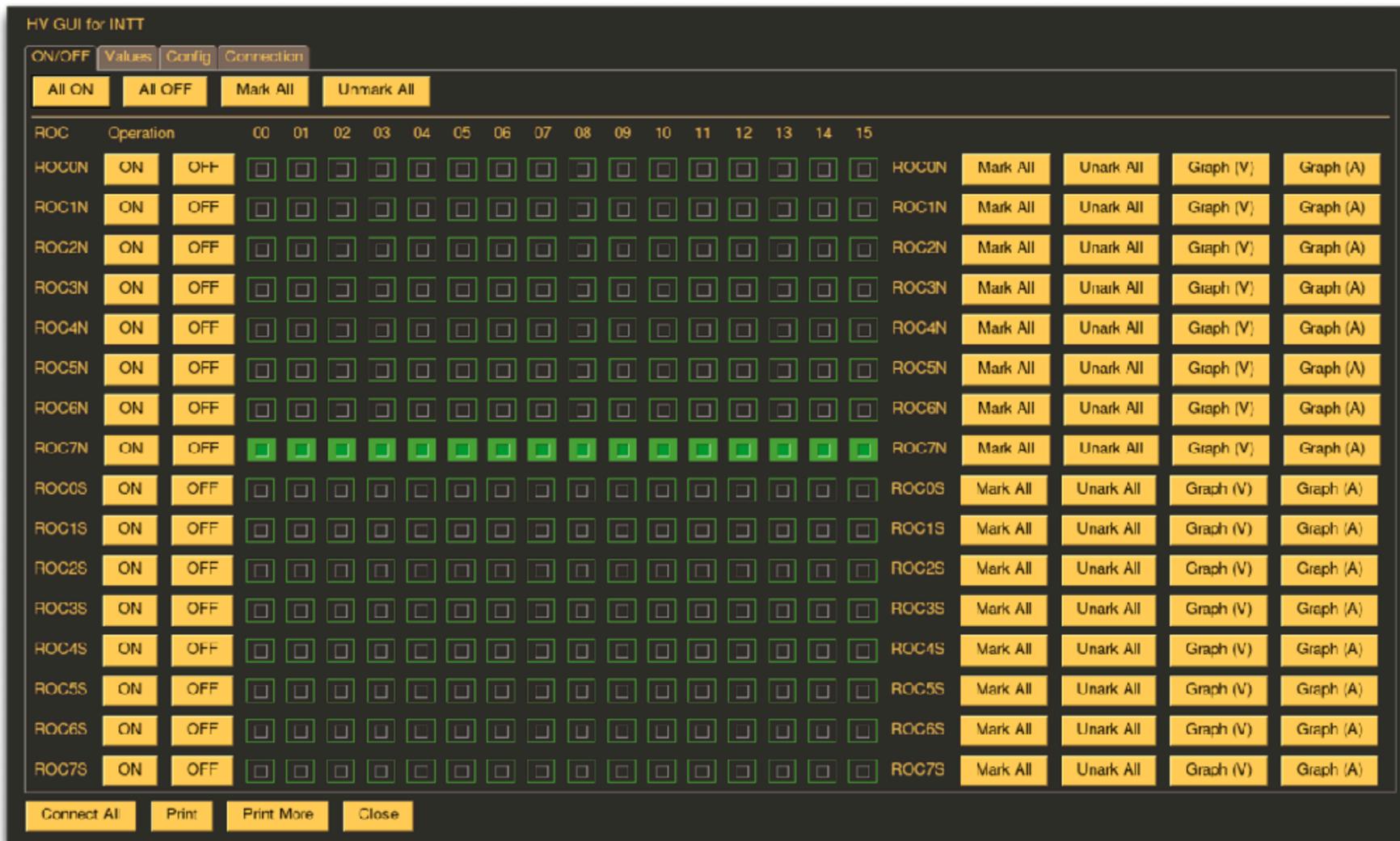
Originally our intent was to use an SNMP driver in our OPC server to communicate with the MPOD HV supplies, but that **has proven difficult so for the time** being we are using scripts to control them. This means that **the HV is controlled outside the Ignition GUI system** for now. If we can find the time to make it work then we can move HV control into Ignition.

Best,

Steve Boose

Ignition designer と SNMP は相性が悪いらしい。
仕方がないので好き勝手に作ってみた。

HV GUI アプリ

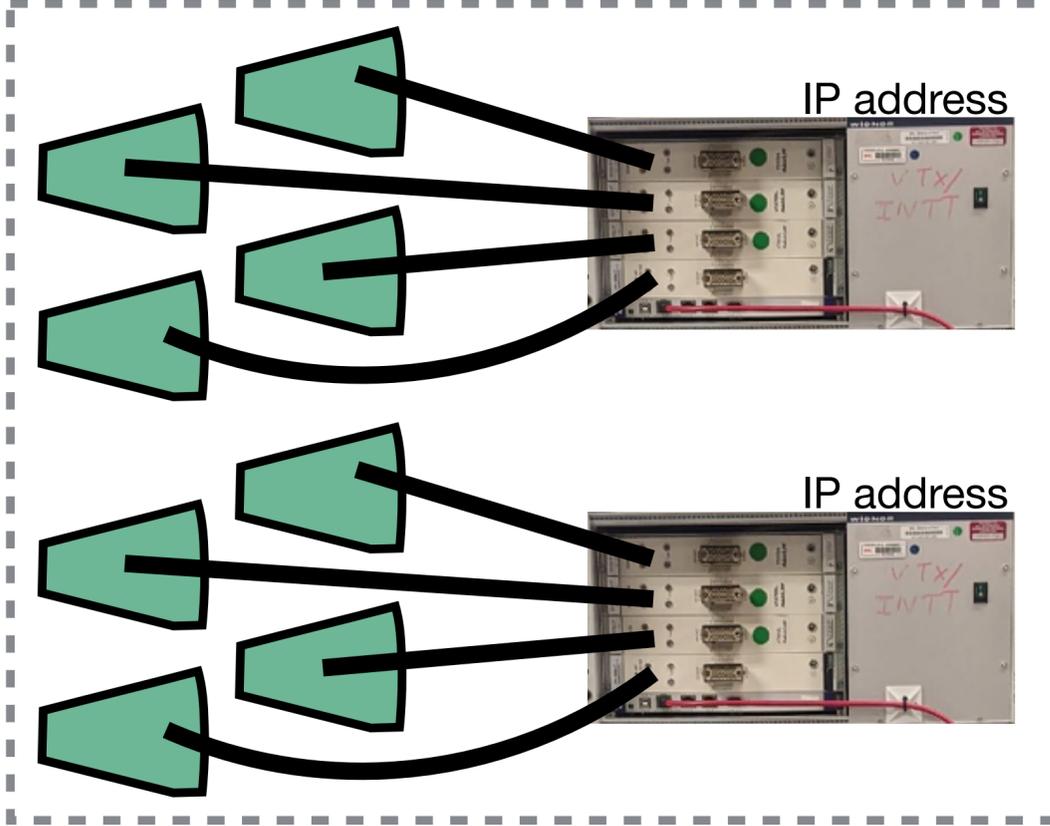


言語: Python3

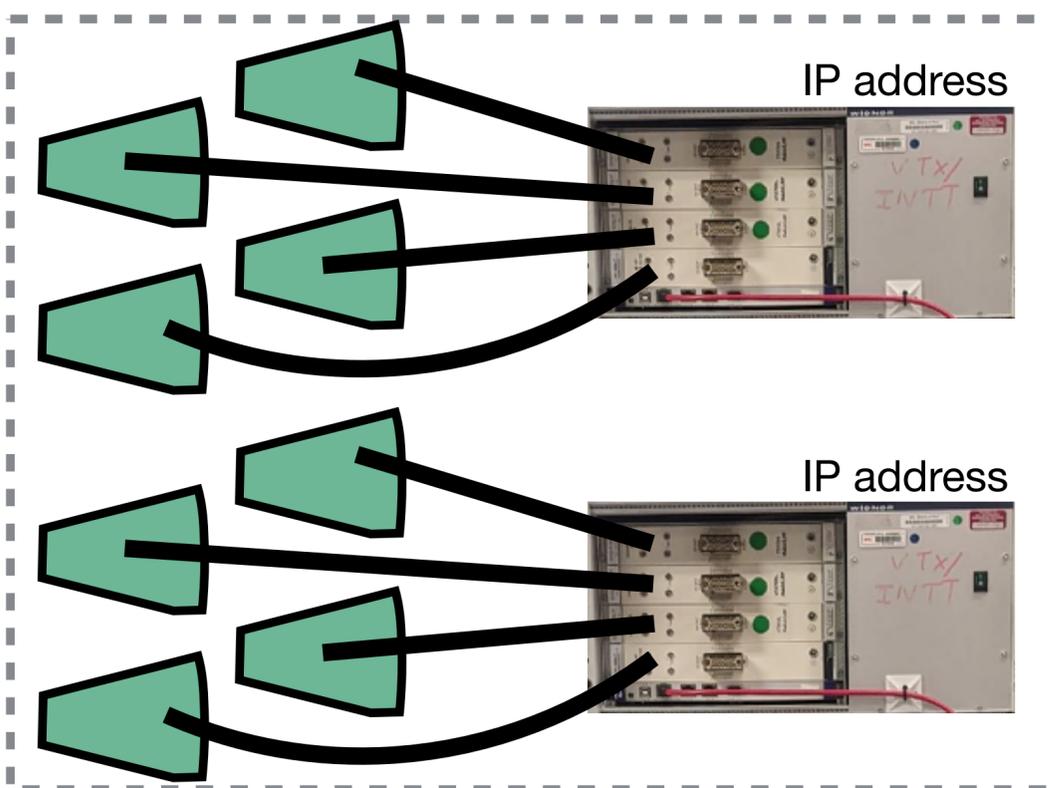
ライブラリ: PySimpleGUI,

構造: ローカル環境で SMTP コマンドを生成し, サーバーに RPC でコマンドを実行させる

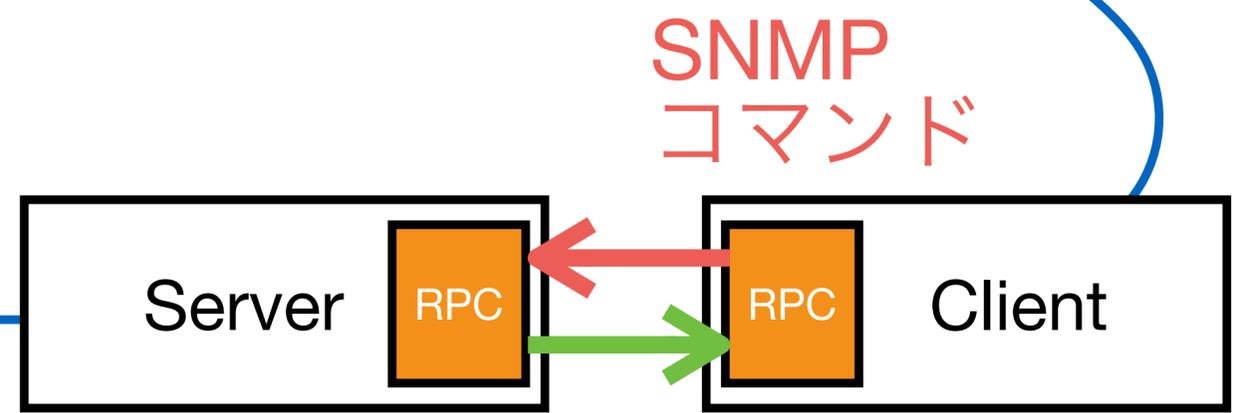
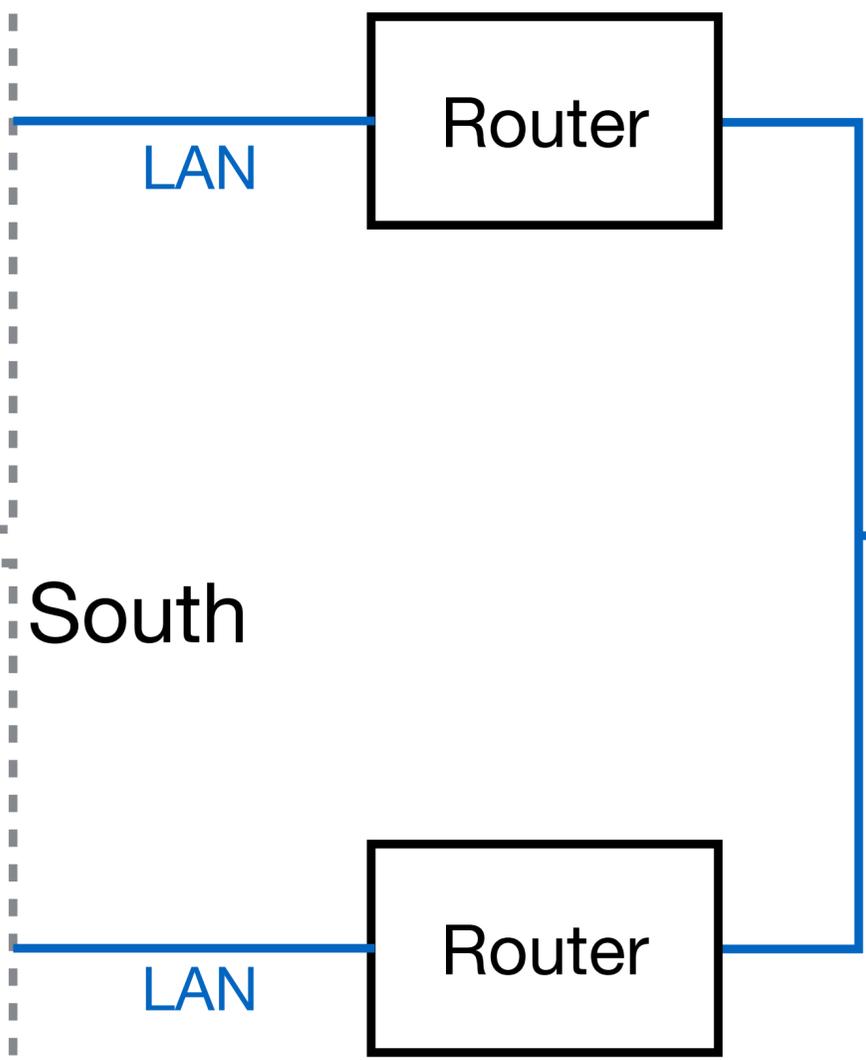
HV GUI アプリ：構造



North



South



ステータス,
電圧値など



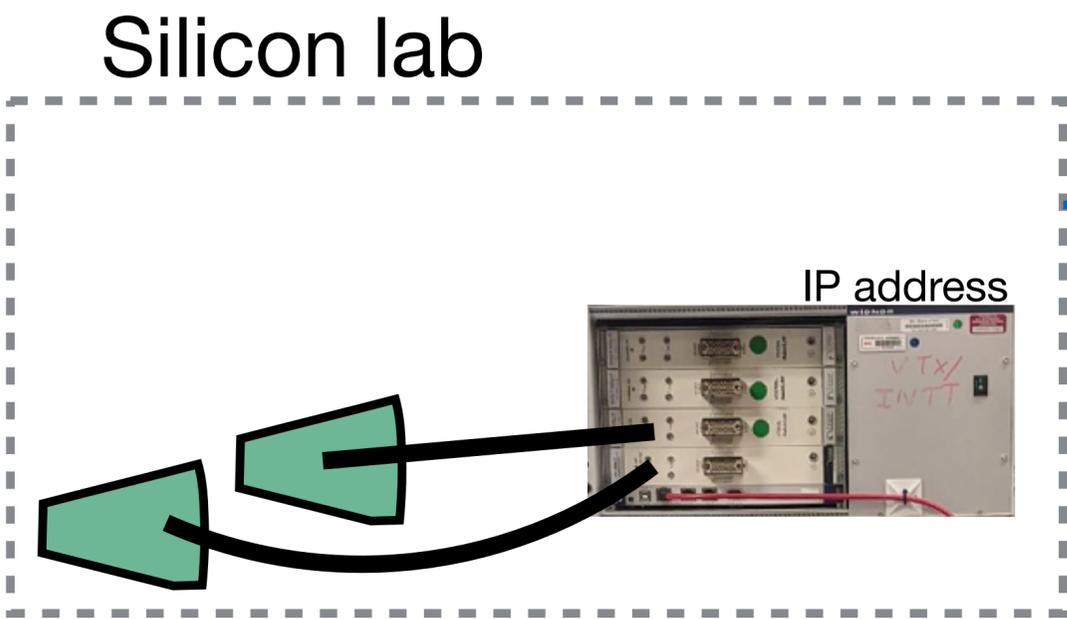
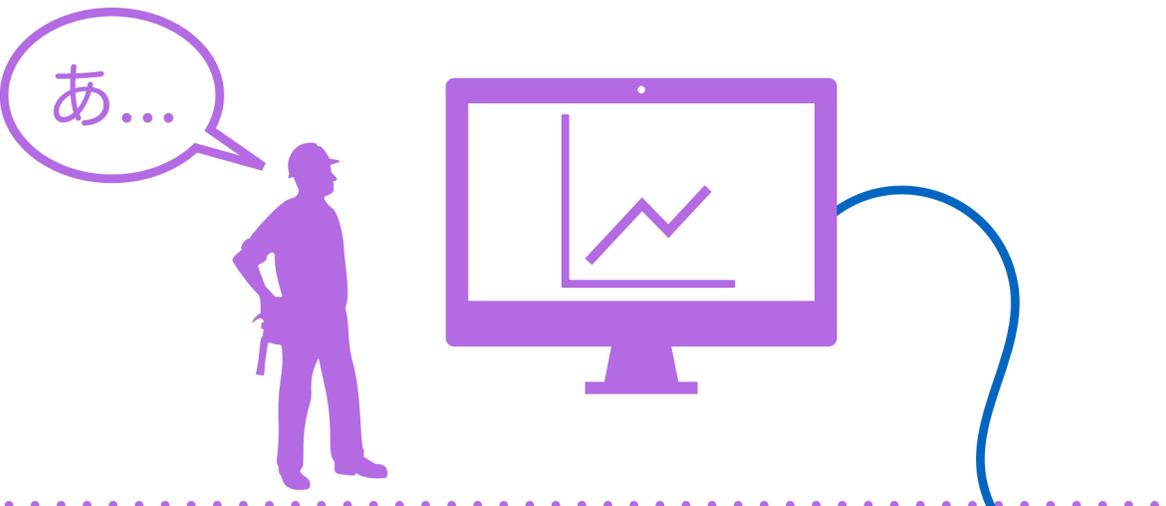
← MPOD 制御
← 読み出し

RPC →

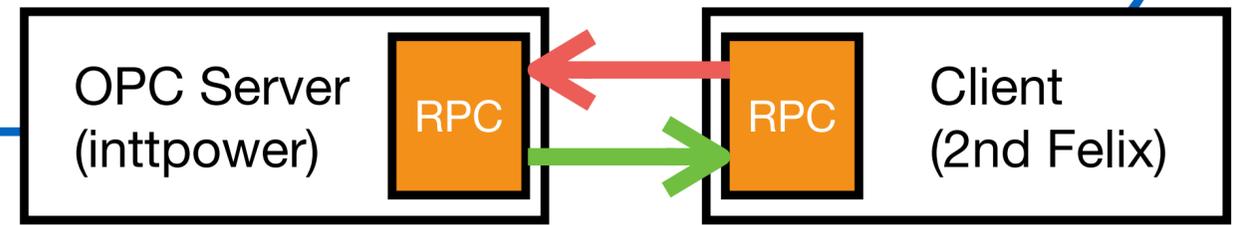
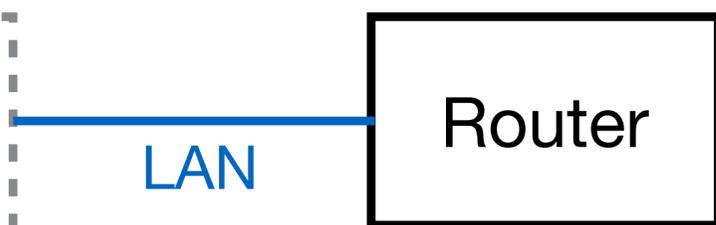


HV GUI アプリ：構造（今のところ）

sPHENIX ネットワークの外？



IP address



ステータス,
電圧値など

MPOD への SNMP コマンド

若田さんの作ったプログラム (intt@inttpower:~/power/snmp/header.py) を調整して使用
基本的には

```
snmpget -Oqv -v 2c -m +WIENER-CRATE-MIB -c guru 10.20.34.145 outputMeasurementSenseVoltage.u15
```

のようなコマンドをシェルで実行している

HV GUI アプリ：全般

タブ切り替え

The screenshot shows the 'HV GUI for INTT' application. At the top, there are four tabs: 'ON/OFF', 'Values', 'Config', and 'Connection'. The 'Connection' tab is selected, as indicated by a blue arrow and the text 'タブ切り替え'. Below the tabs are four buttons: 'All ON', 'All OFF', 'Mark All', and 'Unmark All'. The main area is a grid of 28 rows (ROC0N to ROC7S) and 16 columns (00 to 15). Each row contains an 'ON/OFF' status, a grid of 16 checkboxes, and four buttons: 'Mark All', 'Unmark All', 'Graph (V)', and 'Graph (A)'. The 'ON/OFF' status for all rows is 'ON' and 'OFF'. The checkboxes for ROC7N are all checked (green), while others are unchecked (grey). At the bottom, there are four buttons: 'Connect All', 'Print', 'Print More', and 'Close'.

ROC	Operation	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	ROC	Mark All	Unark All	Graph (V)	Graph (A)
ROC0N	ON OFF	<input type="checkbox"/>	ROC0N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC1N	ON OFF	<input type="checkbox"/>	ROC1N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC2N	ON OFF	<input type="checkbox"/>	ROC2N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC3N	ON OFF	<input type="checkbox"/>	ROC3N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC4N	ON OFF	<input type="checkbox"/>	ROC4N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC5N	ON OFF	<input type="checkbox"/>	ROC5N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC6N	ON OFF	<input type="checkbox"/>	ROC6N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC7N	ON OFF	<input checked="" type="checkbox"/>	ROC7N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC0S	ON OFF	<input type="checkbox"/>	ROC0S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC1S	ON OFF	<input type="checkbox"/>	ROC1S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC2S	ON OFF	<input type="checkbox"/>	ROC2S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC3S	ON OFF	<input type="checkbox"/>	ROC3S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC4S	ON OFF	<input type="checkbox"/>	ROC4S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC5S	ON OFF	<input type="checkbox"/>	ROC5S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC6S	ON OFF	<input type="checkbox"/>	ROC6S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC7S	ON OFF	<input type="checkbox"/>	ROC7S	Mark All	Unark All	Graph (V)	Graph (A)															

HV GUI アプリ：通信設定

設定ファイルの指定
(DB から直接取得すべき)

```
1 #####  
2 #  
3 # Connection configuration #  
4 #  
5 #####  
6  
7 ROC0N not_used  
8 ROC1N not_used  
9 ROC2N not_used  
10 ROC3N not_used  
11 ROC4N not_used  
12 ROC5N not_used  
13 ROC6N not_used  
14 ROC7N 10.20.34.145 161 0  
15 ROC0S not_used  
16 ROC1S not_used  
17 ROC2S not_used  
18 ROC3S not_used  
19 ROC4S not_used  
20 ROC5S not_used  
21 ROC6S not_used  
22 ROC7S not_used
```

ROC ごとの
(MPOD モジュールごと)
IP アドレス設定

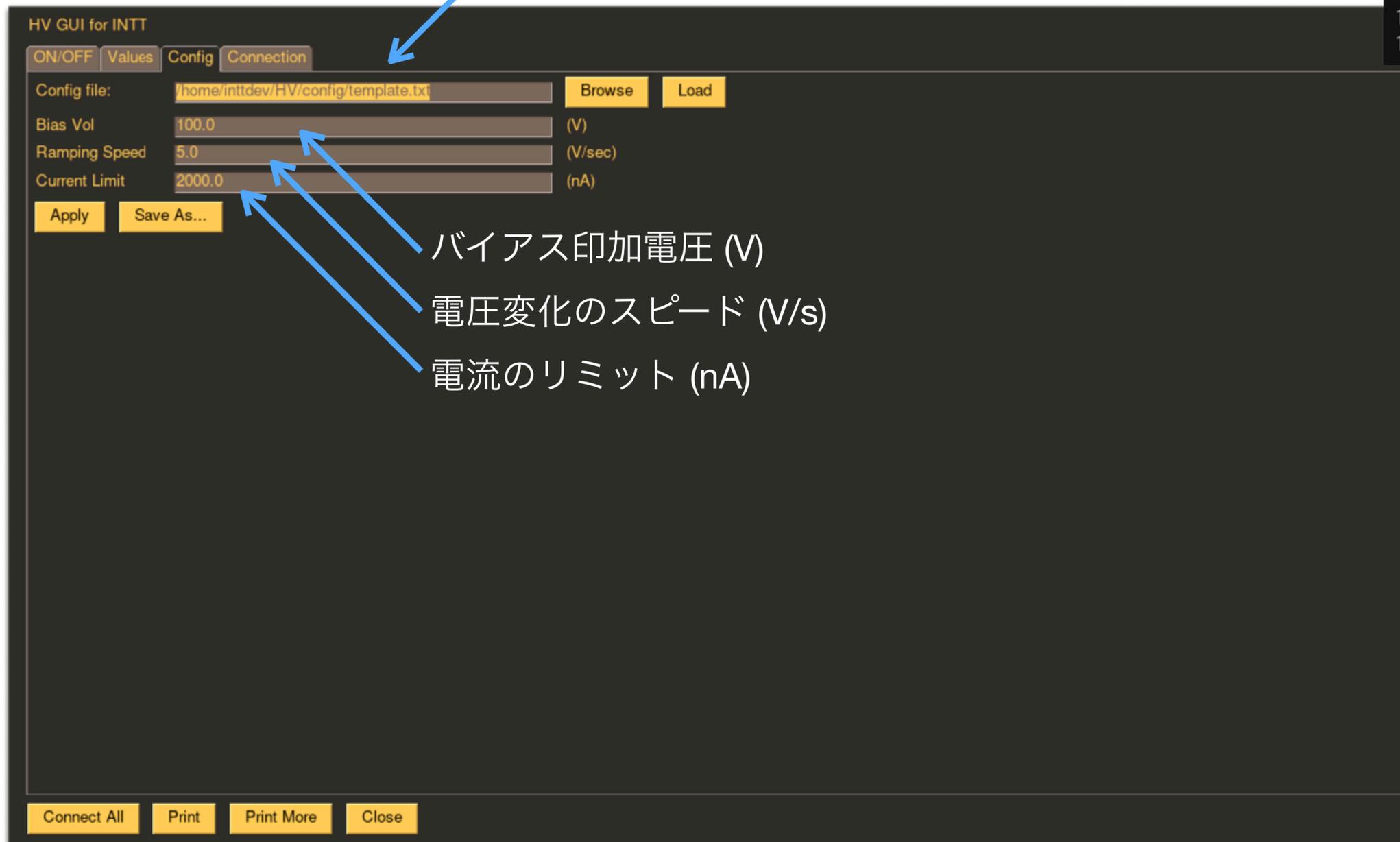
Module	Status	IP Address	Action
ROC0N	Not used		Connect, Reset Emergency
ROC1N	Not used		Connect, Reset Emergency
ROC2N	Not used		Connect, Reset Emergency
ROC3N	Not used		Connect, Reset Emergency
ROC4N	Not used		Connect, Reset Emergency
ROC5N	Not used		Connect, Reset Emergency
ROC6N	Not used		Connect, Reset Emergency
ROC7N	Connected	10.20.34.145	Connect, Reset Emergency
ROC0S	Not used		Connect, Reset Emergency
ROC1S	Not used		Connect, Reset Emergency
ROC2S	Not used		Connect, Reset Emergency
ROC3S	Not used		Connect, Reset Emergency
ROC4S	Not used		Connect, Reset Emergency
ROC5S	Not used		Connect, Reset Emergency
ROC6S	Not used		Connect, Reset Emergency
ROC7S	Not used		Connect, Reset Emergency

接続状況
(クレートと通信できたかを表示している)

クレートの IP アドレス (モジュール 4 つまでが同一クレートに入るのので、スロット番号も加える)

HV GUI アプリ：バイアス設定

設定ファイルの指定
(DB から直接取得すべき)



バイアス印加電圧 (V)
電圧変化のスピード (V/s)
電流のリミット (nA)

```
1 #####  
2 # #  
3 # Configuration for HV #  
4 # #  
5 #####  
6  
7 # voltage [value (V)]  
8 voltage 100  
9  
10 # speed [value (V/sec)]  
11 speed 5  
12  
13 # current_limit [value (nA)]  
14 current_limit 2000
```

HV GUI アプリ : ON/OFF

- : 操作しない
- : 操作する
- : 今は ON
- : 今は OFF

ON/OFF ボタン

HV GUI for INTT

ON/OFF Values Config Connection

All ON All OFF Mark All Unmark All

ROC	Operation	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	ROC	Mark All	Unark All	Graph (V)	Graph (A)
ROC0N	ON OFF	<input type="checkbox"/>	ROC0N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC1N	ON OFF	<input type="checkbox"/>	ROC1N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC2N	ON OFF	<input type="checkbox"/>	ROC2N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC3N	ON OFF	<input type="checkbox"/>	ROC3N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC4N	ON OFF	<input type="checkbox"/>	ROC4N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC5N	ON OFF	<input type="checkbox"/>	ROC5N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC6N	ON OFF	<input type="checkbox"/>	ROC6N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC7N	ON OFF	<input checked="" type="checkbox"/>	ROC7N	Mark All	Unark All	Graph (V)	Graph (A)															
ROC0S	ON OFF	<input type="checkbox"/>	ROC0S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC1S	ON OFF	<input type="checkbox"/>	ROC1S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC2S	ON OFF	<input type="checkbox"/>	ROC2S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC3S	ON OFF	<input type="checkbox"/>	ROC3S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC4S	ON OFF	<input type="checkbox"/>	ROC4S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC5S	ON OFF	<input type="checkbox"/>	ROC5S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC6S	ON OFF	<input type="checkbox"/>	ROC6S	Mark All	Unark All	Graph (V)	Graph (A)															
ROC7S	ON OFF	<input type="checkbox"/>	ROC7S	Mark All	Unark All	Graph (V)	Graph (A)															

Connect All Print Print More Close

チェックボックスの操作

使っていないモジュールは触れない

HV GUI アプリ : 監視 1

HV GUI for INTT

ON/OFF Values Config Connection

ROC

ROC	unit	ch0	ch1	ch2	ch3	ch4	ch5	ch6	ch7	ch8	ch9	ch10	ch11	ch12	ch13	ch14	ch15
ROC0N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC0N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC1N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC1N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC2N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC2N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC3N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC3N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC4N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC4N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC5N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC5N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC6N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC6N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC7N	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC7N	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC0S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC0S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC1S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC1S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC2S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC2S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC3S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC3S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC4S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC4S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC5S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC5S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC6S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC6S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC7S	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROC7S	A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

update Keep Updated Stop Updating

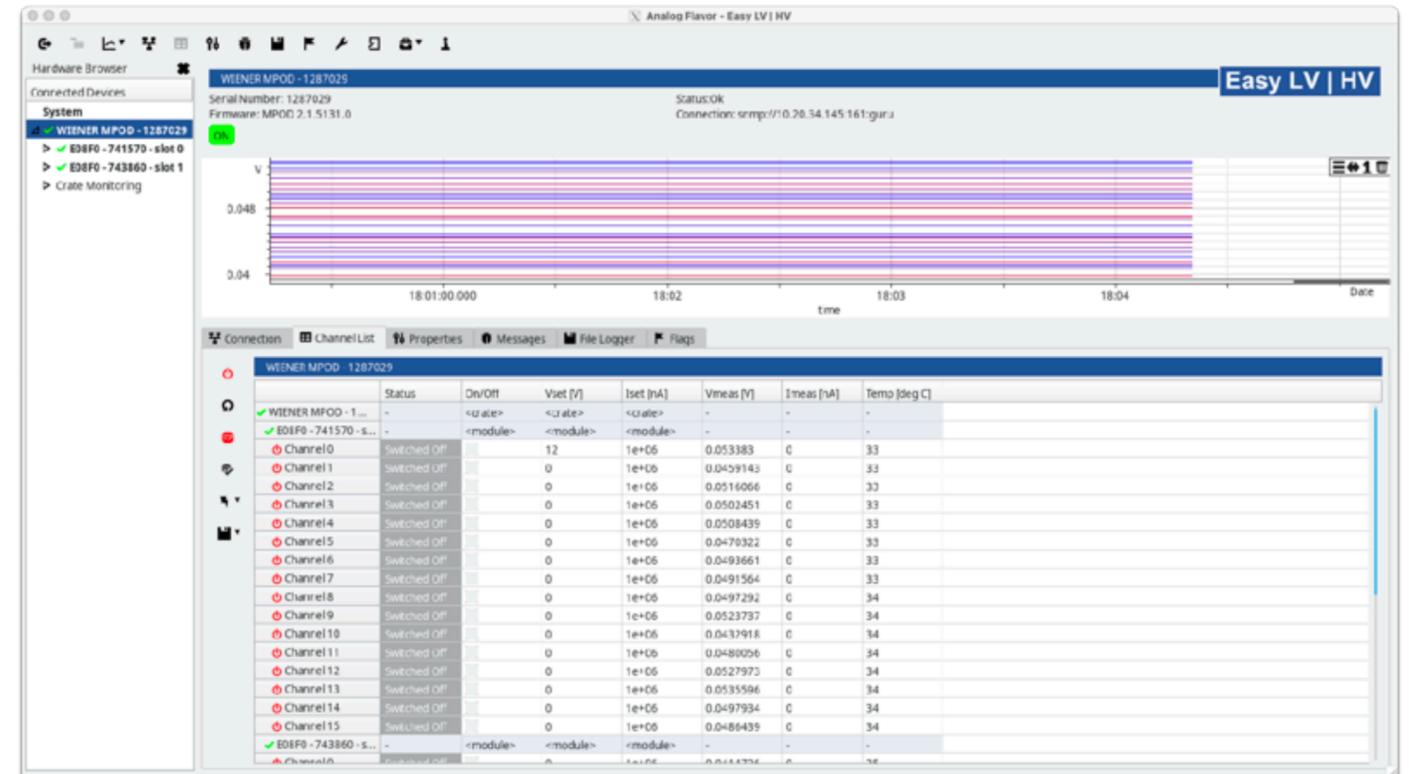
Connect All Print Print More Close

ちょっと見づらい

HV GUI アプリ：監視 2

グラフでバイアス電圧、電流の監視がしたいが・・・

- データは保存するのか？
 - 保存するならDBを使う？
- グラフには何を書くのか？
 - ROC 単位、電圧 or 電流で分ける？
- 技術的にはどうするのか？
 - Ignition designer
 - Python Matplotlib
 - ROOT
 - PostgreSQL + Grafana ←これがよさそう

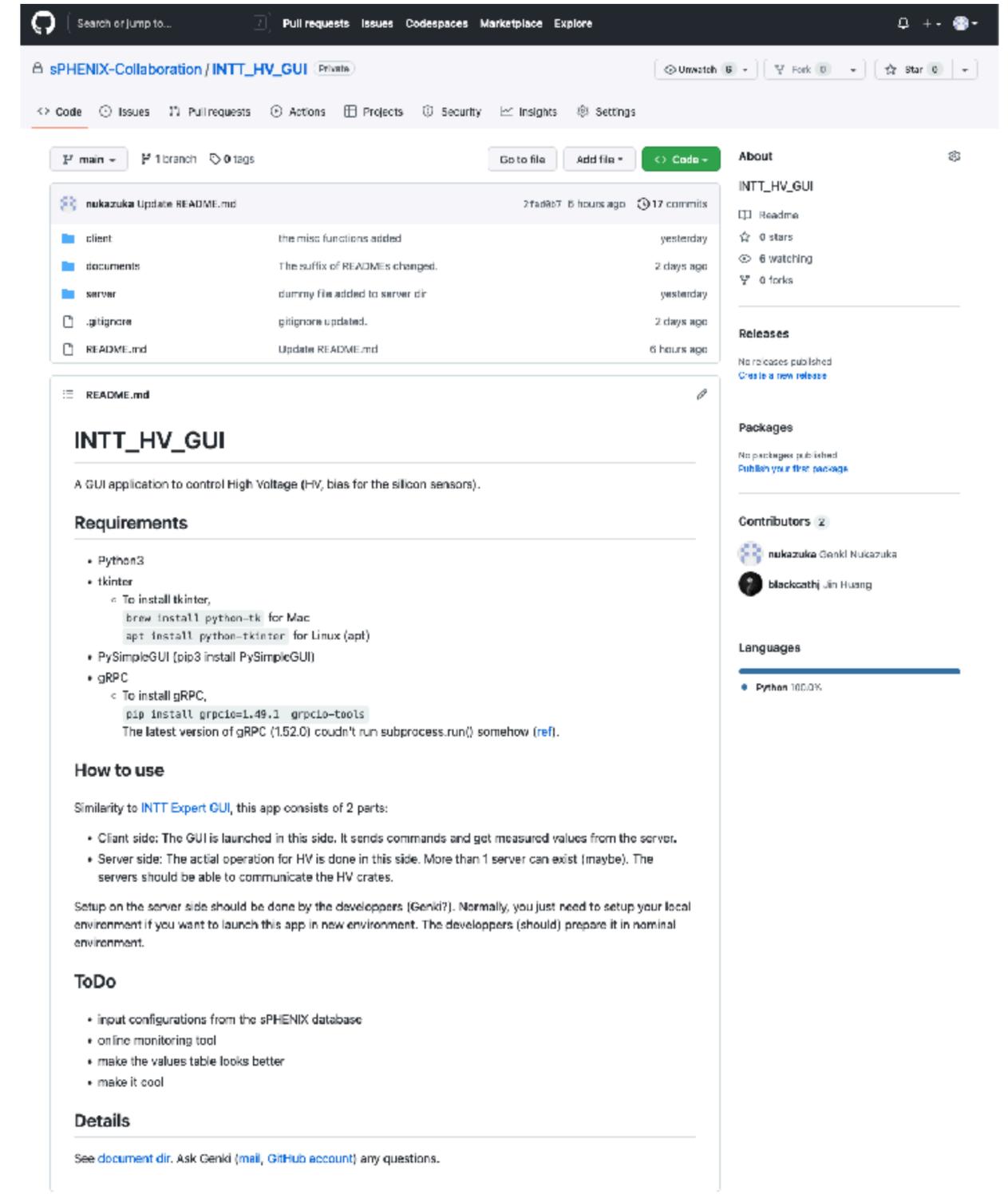


HV GUI アプリ : GitHub? BNL GitTea?

GitHub の sPHENIX_collaboration の INTT_developer チーム
下に [レポジトリ](#) を作った

GitHub レポジトリは private であっても IP アドレスといっ
た重要な情報はアップロードしてはいけならしい
→ すごく不便

BNL の GitTea ならアップロードしていいらしい



The screenshot shows a GitHub repository page for 'SPHENIX-Collaboration / INTT_HV_GUI'. The repository is private and has 17 commits. The main branch is selected. The repository contains a README.md file, which is displayed in the main content area. The README.md file describes the 'INTT_HV_GUI' application, which is a GUI application to control High Voltage (HV) bias for the silicon sensors. It lists requirements for Python3, tkinter, PySimpleGUI, and gRPC, and provides instructions on how to use the application. The README.md file also includes a 'How to use' section and a 'ToDo' list.

INTT_HV_GUI

A GUI application to control High Voltage (HV, bias for the silicon sensors).

Requirements

- Python3
- tkinter
 - To install tkinter,
`brew install python-tk` for Mac
`apt install python-tkinter` for Linux (apt)
- PySimpleGUI (pip3 install PySimpleGUI)
- gRPC
 - To install gRPC,
`pip install grpcio=1.49.1 grpcio-tools`
The latest version of gRPC (1.52.0) couldn't run subprocess.run() somehow (ref).

How to use

Similarity to [INTT Expert GUI](#), this app consists of 2 parts:

- Client side: The GUI is launched in this side. It sends commands and get measured values from the server.
- Server side: The actual operation for HV is done in this side. More than 1 server can exist (maybe). The servers should be able to communicate the HV crates.

Setup on the server side should be done by the developers (Genki?). Normally, you just need to setup your local environment if you want to launch this app in new environment. The developers (should) prepare it in nominal environment.

ToDo

- input configurations from the sPHENIX database
- on line monitoring tool
- make the values table looks better
- make it cool

Details

See [document dir](#). Ask Genki ([mail](#), [GitHub account](#)) any questions.

HV GUI アプリ：状況

- UI 作成：ver1 完成
- MPOD との通信：できた
- 電圧値の取得：できた
- 電流値の取得：まだ
- その他パラメータの設定・取得：まだ
- 電圧の ON/OFF：まだ
- データベース作成（必要なら）：まだ
- データベースとの接続：まだ
- 監視ツール作成：まだ
- シリコンラボでの試験運用：まだ