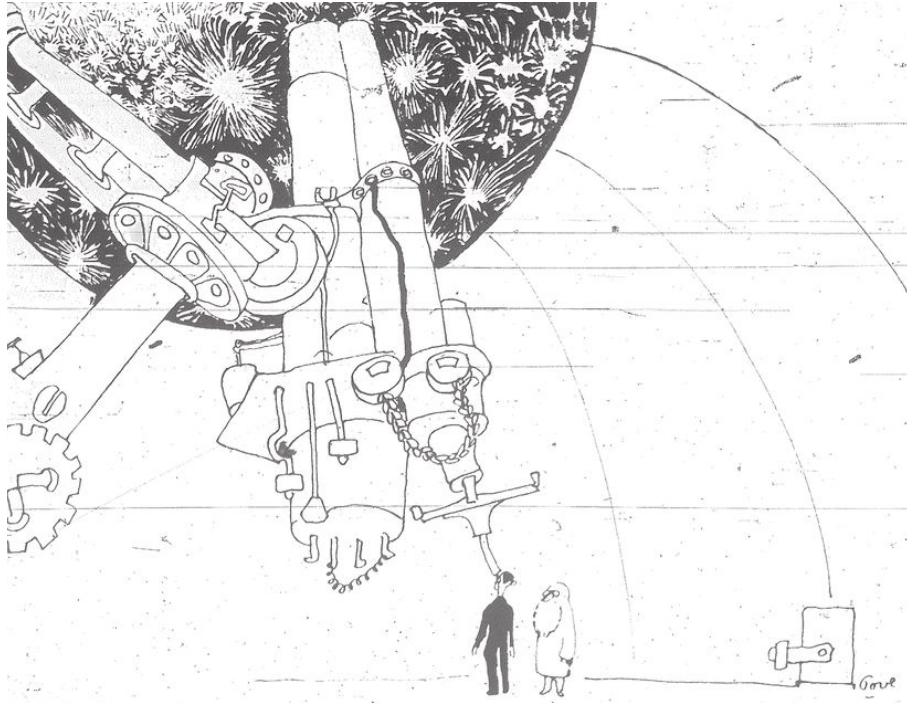




AMPEL

Analysis Engine 4 VRO



— Jasså, är det Venus!? Jag måste nog medge att jag hade föreställt mig henne annorlunda . . .

Jakob Nordin
Humboldt University of Berlin



I - How to get data (now)

I - How



- **AMPEL Kafka**
- Choose Topic
- Parse Reports

```
from hop import Stream
from hop.io import StartPosition
from AmpelReport import AmpelTransientReport
```

[2]:

```
host = 'kafka://kafka.scimma.org/'
topic = 'ampel.lsst.reports-test'
```

[3]:

```
stream = Stream(start_at=StartPosition.EARLIEST, until_eos=True)
```



Hopskotch kafka streams:
<https://www.scimma.org/hopskotch>

I - How

- AMPEL Kafka
- **Choose Topic**
- Parse Reports



ampel.lsst.extragalactic-transients

Extragalactic transients with classification and/or distance.

ampel.lsst.extragalactic-infant

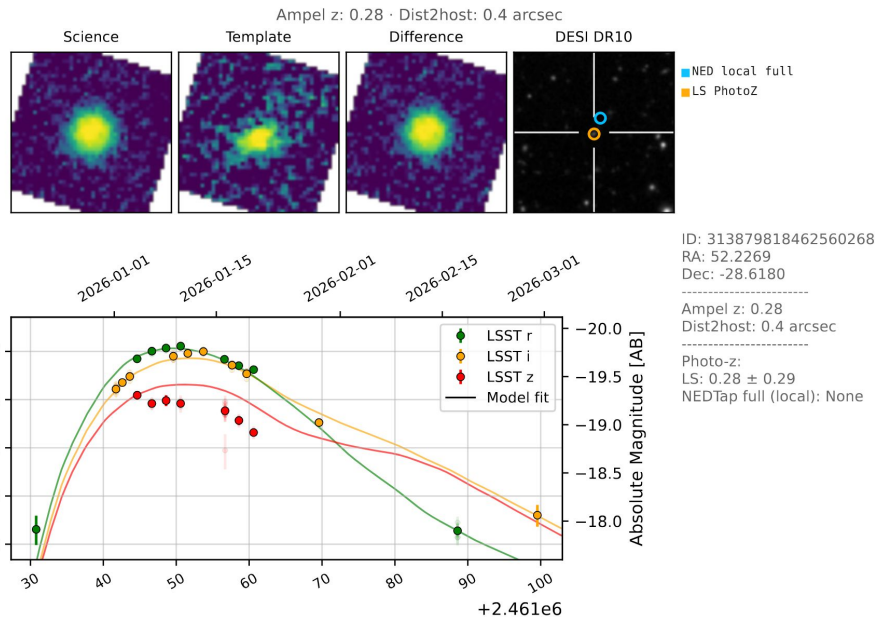
Young transients associated with nearby galaxies.

ampel.lsst.too-transients

Transients associated with VRO ToO/MM visits.

I - How

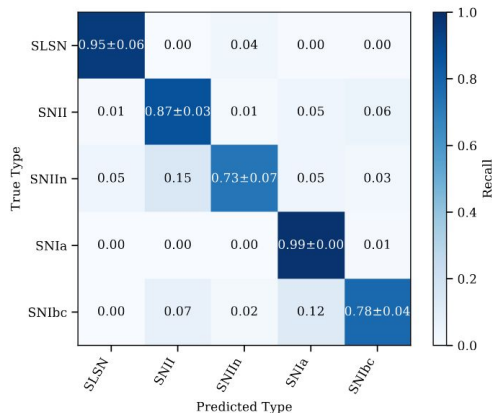
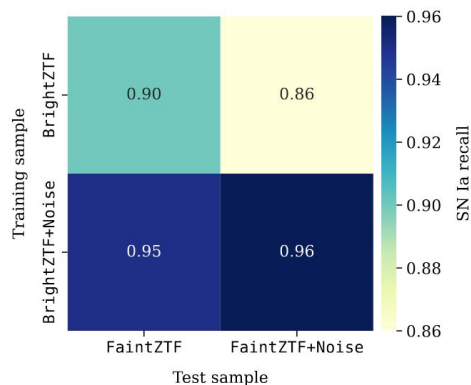
- AMPEL Kafka
- Choose Topic
- **Parse Reports**
- Use AmpelAccess
 - <https://github.com/AmpelAstro/Ampel-Access>
 - Visualize
 - Filter
 - Other Observatories
 - ...
- Automate ReportResponse



II - What AMPEL adds

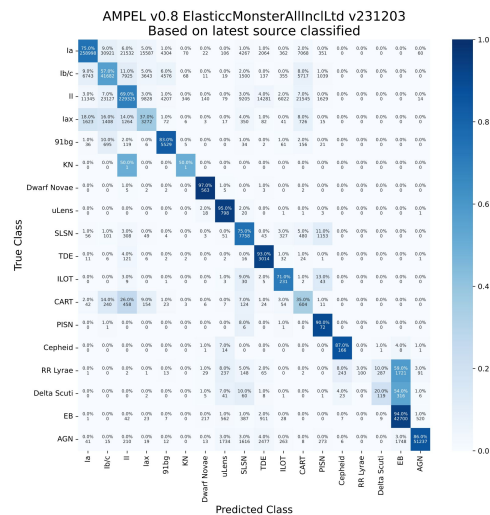
II - What

- **Photometric Classification**
- **Catalog Information**



noiZTF: Based on real data
Townsend et al (<https://arxiv.org/abs/2602.13036>)

Versioning & Verification



Blinded tests: ELAsTiCC & Mallorn
Nordin et al (A & A, 698, A13 (2025))



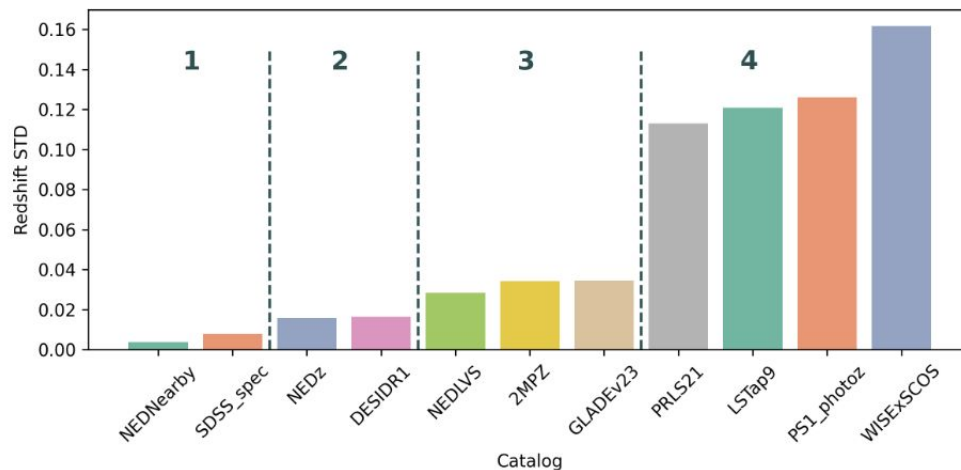
II - What



- Photometric Classification
- Catalog Information

Aggregate Catalog Information

- Ampel z
- Ampel z Group



III - Why an Analysis Engine

III - Why

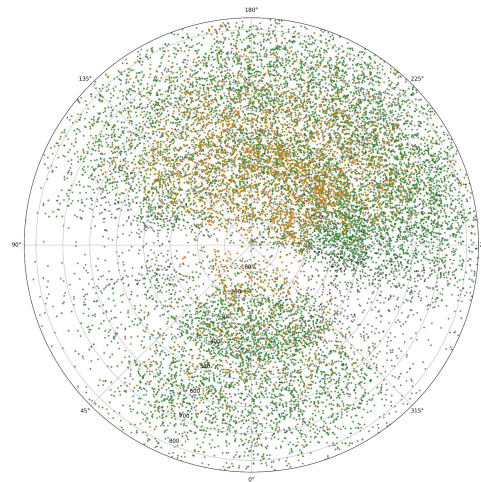
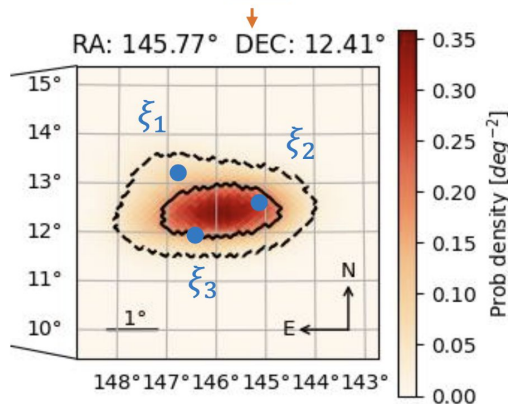
Guided by VRO Science

Large, statistical analysis:

- Reproduce analysis after 3yrs
- Improve grandfather pipeline
- Rerun with new method

MM Associations

$$x_i = \{t_i, E_i, \omega_i, \text{signalness}\}$$



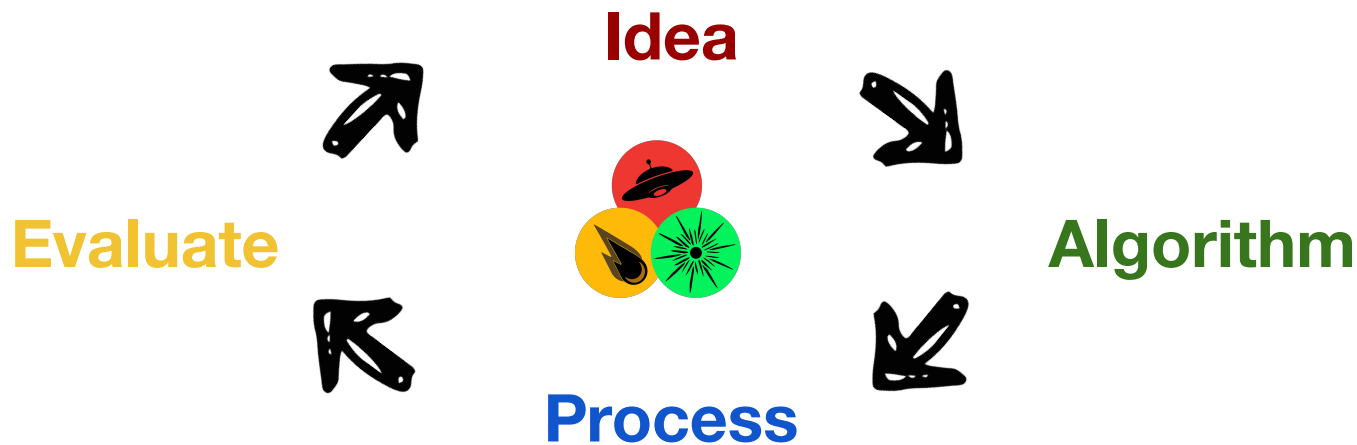
SN Ia
Selection
Function



Telescope
Networks

III - Why

AMPEL runs the
Analysis Cycle



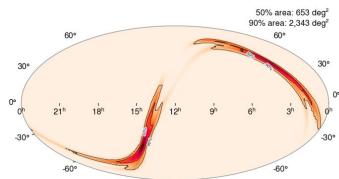
1. Simulation 2. Archive 3. Real-time

Front-end
Follow-up

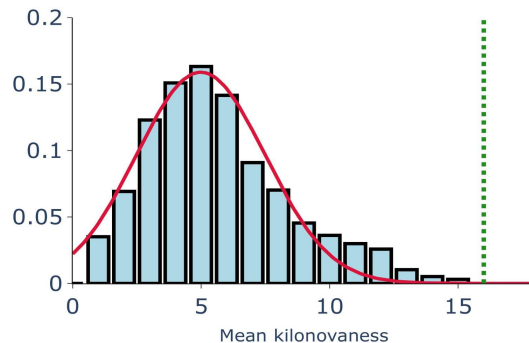
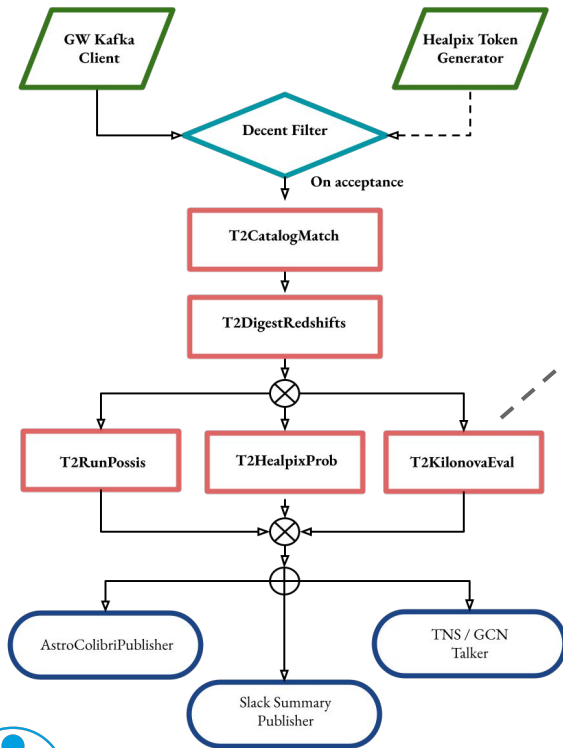
III - Why

1. Design

- Install local environment
- Design workflow
- Identify existing units



Development Process



2. Develop

- Create interface to science specific algorithm(s).
- Test ...

3. Run

- Scale at computer center
- Public live instance @ DESY
- Publish code for others

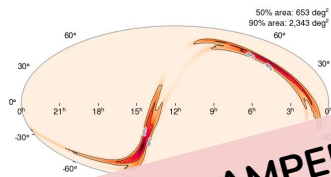


III - Why

Development Process

1. Design

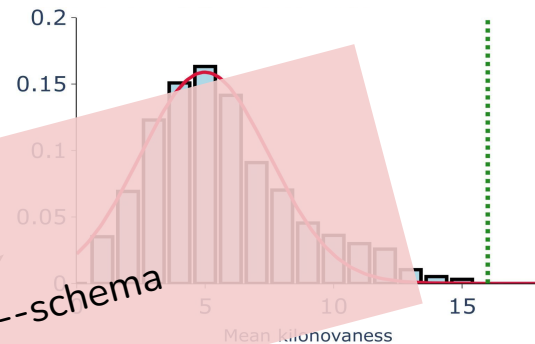
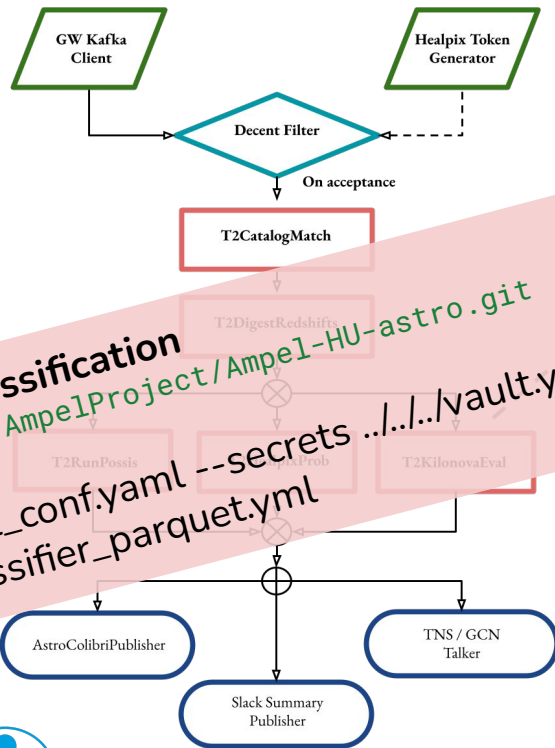
- Install local environment
- Design workflow
- Identify existing units



Reproduce AMPEL VRO Classification
`git clone https://github.com/AmpelProject/Ampel-HU-astro.git`
`ampel job --config ../ampel_conf.yaml --secrets ../secrets.yaml --schema ../vault.yaml`
`ampel job --config ../ampel_conf.yaml --secrets ../secrets.yaml --schema ../vault.yaml`

3. Run

- Scale vroprep computer center
- Public live instance @ DESY
- Publish code for others



2. Develop

- Create interface to science specific algorithm(s).
- Test ...

Conclusions



1. **AMPEL: Code-to-data in astronomy**
2. **Curated Kafka streams**
3. **Augmented alerts - use but with caution**
4. **Like repeatable, scalable, modular? Run it yourself**

Links:

- Info page: <https://ampelastro.github.io/>
- Access Kafka alerts: <https://github.com/AmpelAstro/Ampel-Access>
- Install AMPEL: <https://github.com/AmpelAstro/Ampel-HU-astro>
- Try Hopskotch: <https://www.scimma.org/hopskotch>

Or talk to me!