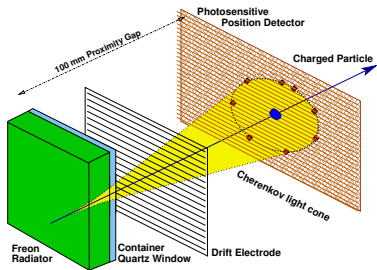


Main components of the existing RICH

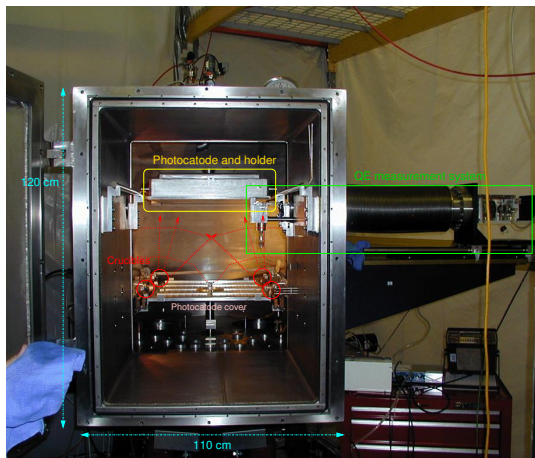


Radiator	15 mm thick Liquid Freon (C_6F_{14} , $n=1.28$)
Photon converter	300 nm CsI film coated on Pad Planes
Position Detector	$1940 \times 403 \text{ mm}^2$ - Multi Wire/Pad Proportional Chamber filled with Methane at STP, HV= $1050 \div 1100 \text{ V}$
FE Electronics	11520 analog chs, multiplexed S&H

NOTE1: The CsI shall be evaporated on the 3 pad planes before the experiment (require 2 weeks approx.)

NOTE2: Once evaporated, the pads shall not be exposed to air

Evaporation Facility for large area photocathode



- Stainless steel cylindrical vessel
- 3 pumps (scroll + molecular + cryogenic) provide vacuum of $5 \cdot 10^{-7}$ mbar in < 24 h
- 4 crucibles \rightarrow thickness uniformity $\sim 10\%$
- CsI powder (from CERN) evaporated at ~ 500 °C

Evaporation Facility and Glove Box



- Clean environment required
- **Evaporation facility requires about $5 \times 5 \text{ m}^2$**
- **The glove box requires about $4 \times 7 \text{ m}^2$**

Current Status

The RICH operated successfully in the E94-107 hypernuclear spectroscopy experiment

- RICH is parked at JLab (Jack knows)
- The spare radiator is broken
- Evaporation Facility and Glove Box are at Stony Brook University

Already Scheduled Maintenance

- Ship the broken radiator to Rome (within few weeks)
- Repair it in the next months
- Send back to JLab the spare radiator

NOTE: Before installation in Hall A, CsI shall be evaporated on the pads

Two Evaporation Options

Option 1

- The evaporation can be done at Stony Brook
- The evaporated pad planes are moved to JLab by track; the pad planes shall be fluxed by inert gas during the transportation (legal and practical questions are under evaluation)
- Pad will be installed in the RICH at JLab

Option 2

- The evaporation facility is moved back to JLab (proper/clean working room required !!)
- Pads are evaporated at JLab and installed in the RICH

Both Options require the Glove Box to be moved to JLab (room needed !!)
We prefer option 1 (less effort, cleaner environment at Stony Brook) x

Final decision late spring

Upgrade Options

NO Upgrade

Present RICH π rejection 1:100 at 2.4 GeV ($\sim 95\%$ efficiency)

MINOR: Extended proximity gap

- Add a stainless steel frame ~ 5 cm tick.
- Expected π rejection at 1:500
- No risk foreseen (Easy to come back to the original version)

MAJOR: New radiator refractive index + extended proximity gap

- Change the liquid freon radiator^a
- Expected π rejection better than 1:1000 (including previous upgrade)
- Require: cooling of the freon recirculation system (minor issue according to Brian Kross) and cooling of the radiator vessel in the RICH (major issue)
- Carefull evaluation of the technical aspects is underway

Plan and cost

- February-April/06: more detailed study of the upgrade impact and practical aspects (including additional Montecarlo analysis)
- May/06: Final decision on upgrade

We will try to design the upgrade so that one can come back to the original configuration in short time (one/two days)

Costs, very very preliminary!

- MINOR Upgrade: ~ 5 k\$
- MAJOR Upgrade: ~ 20 k\$ + Cooling and Insulation of the freon circulating system (ask Jack/Brian)

Human Resources

- 1 technician at JLab (Brian/Jack are the ideal people)
- 1 data acquisition expert at JLab (shall replace Bodo)
- 1 detector supervisor at JLab (may coincide with the previous one)
- 3 technicians from Rome
- 1 PhD student would be very welcome