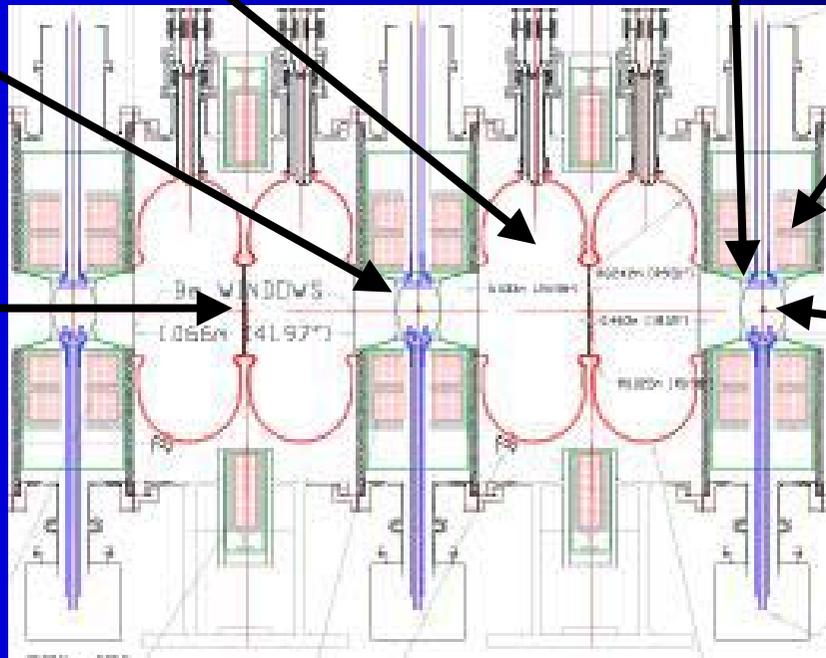
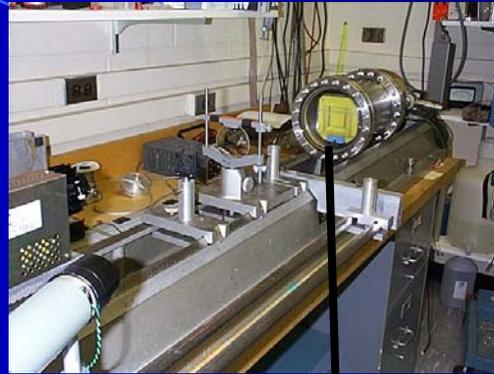
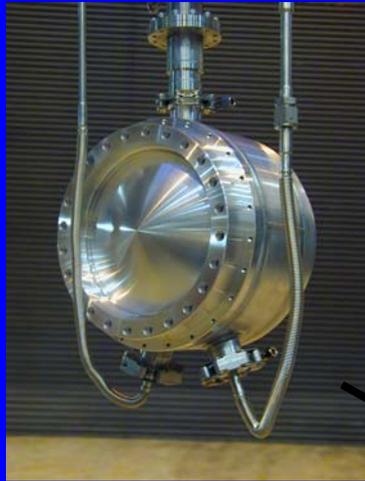


MUCOOL R&D : What about the beamline ?

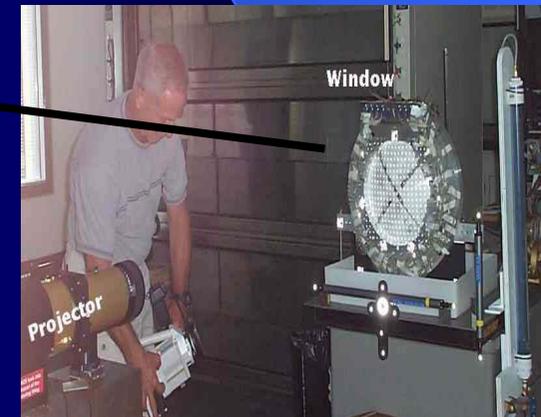
Steve Geer

January 2002

Some MUCOOL Accomplishments



Liq. H RF Liq. H RF Liq. H



The MUTAC Report Says:

“Ionization cooling remains the primary R&D issue for the collaboration. The most difficult part is the development and integration of the hardware, which is the goal of the MUCOOL efforts.”

Why is MUCOOL so Challenging ?

We need to be able to operate a system in which Liquid Hydrogen is separated by a baking foil from an ignition source containing the energy of 10,000 light bulbs, and all of this is within a system of SC solenoids that might quench from time-to-time. The system must operate as 10^{12} charged particles pass, and WE NEED TO GET SAFETY APPROVAL.

We need to understand high gradient NCRF Cavity operation in Multi-Tesla magnetic fields, going well beyond the current state-of-the-art. We must understand and solve our present cavity breakdown problems.

What Must We Do To Meet the Challenge ?

We must become the worlds experts in high-gradient NCRF cavity operation in multi-Tesla fields → 805 MHz program

We must demonstrate 201 MHz NCRF Cavity operation at high-gradient in a multi-Tesla field → 201 MHz program

We must obtain the expertise to enable us to understand the LH2 absorber safety and cryo issues so that we can then design a system in which the absorber is next to a cavity → Absorber 1&2 Filling program

We must exploit the expertise from our first absorber filling to design and demonstrate an absorber operating next to a cavity, within a solenoid system → MUCOOL Systems Test program

We must show that cavities and absorbers will operate in an intense beam.

Status in December 2002 ?



201 MHz Cavity Designed

805 MHz R&D Ongoing

201 MHz Cavity Construction Begun ?

Cavity Solenoid Design Begun ?

805 MHz and/or 201 MHz test system installation about to begin ?

Absorber filling systems installation about to begin

First Absorber Test Setup Designed – Safety Process Advanced

Leverage

MC	1.27 M\$
Fermilab	3.15 M\$
ICAR	1.35 M\$
Japan	0.10 M\$
TOTAL	5.87 M\$

For every \$1 the MC puts into MUCOOL we have managed to get \$3.6 additional support.

The MC support is **VITAL** since it is our **primary source of M&S** which in **FY02** determines our schedule.

New Funding Proposals

SBIR 1	HP Gas Design	R. Johnson
SBIR 2	HP Gas Studies	R. Johnson
SBIR 3	805 MHz R&D	J. Norem
SBIR 4	201 MHz R&D	R. Rimmer
NSF Proposal	Beam Extraction	C. Johnstone
Lab Proposal	805 MHz R&D	S. Geer

Hard to maintain such a large leverage ratio.

Input for Long-Range MUCOOL Program - Costs & Timescales

<u>R&D Sub-Program</u>	<u>Cost (K\$)</u>		<u>Estimated Time</u>
	<u>MC</u>	<u>Other</u>	<u>to Execute</u>
Future 805 MHz Cavity R&D	100	200-1000	1-3 years
201 MHz Cavity Design, foils,&grids	575	25	1-1.5 years
201 MHz Cavity Construction	400	0	1 year
LH2 Absorber Prototypes	0	900	2 years
Absorber/RF Test Site	1690	3100	1 year left
Absorber Filling Capability	217	200	6 months
201 MHz Testing Capability	228	200	1 year
805 MHz Testing Capability	186	200	1 year
Solenoid design (for cavity)	500	0	1 year
Solenoid construction (for cavity)	1500	0	1-2 years
Beamline	500-1000	1000-1500	1-2 years
Running	100	200	> 3 years
Carry Over	-274		
SUB-TOTAL Costs (K\$)	~6222	~7325	
Scientist Salaries	400	~5000	4 years
TOTAL	~6622	~12325	

What About The Beamline ?

1. To maintain leverage we need to make proposals
2. We do not yet have an agreed funding plan for the beamline
3. Last Summer we were preparing a proposal for the MUCOOL test program :
 - Document our R&D Plan and define goals & success
 - Get the MUCOOL Experiment exposure within the community
 - Put MUCOOL support within the Lab on a firmer footingDraft proposal exists from last summer ... but needs some re-working.

Should we get back to working on the proposal ?

→ DISCUSSION ABOUT PURPOSE OF BEAM TESTS