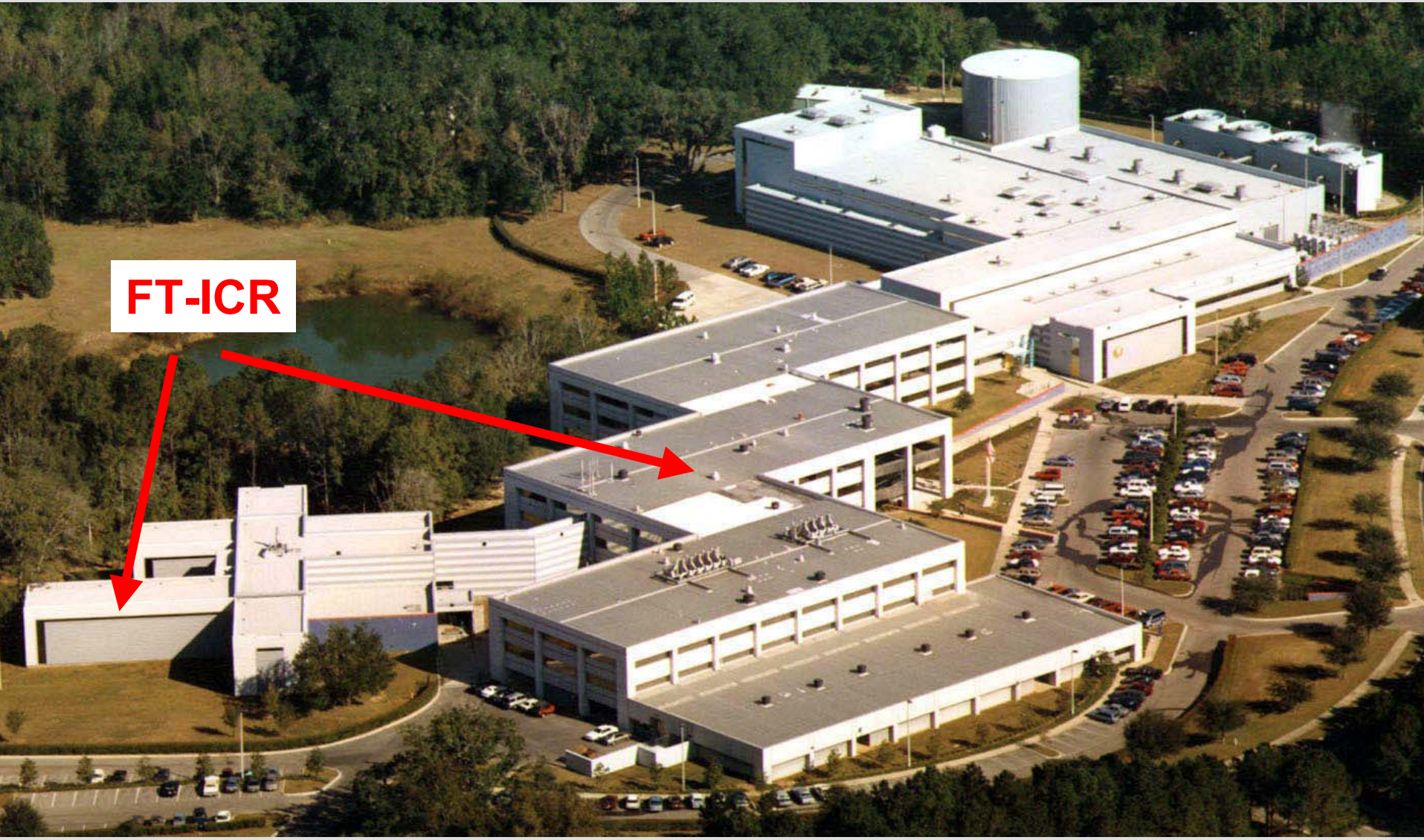
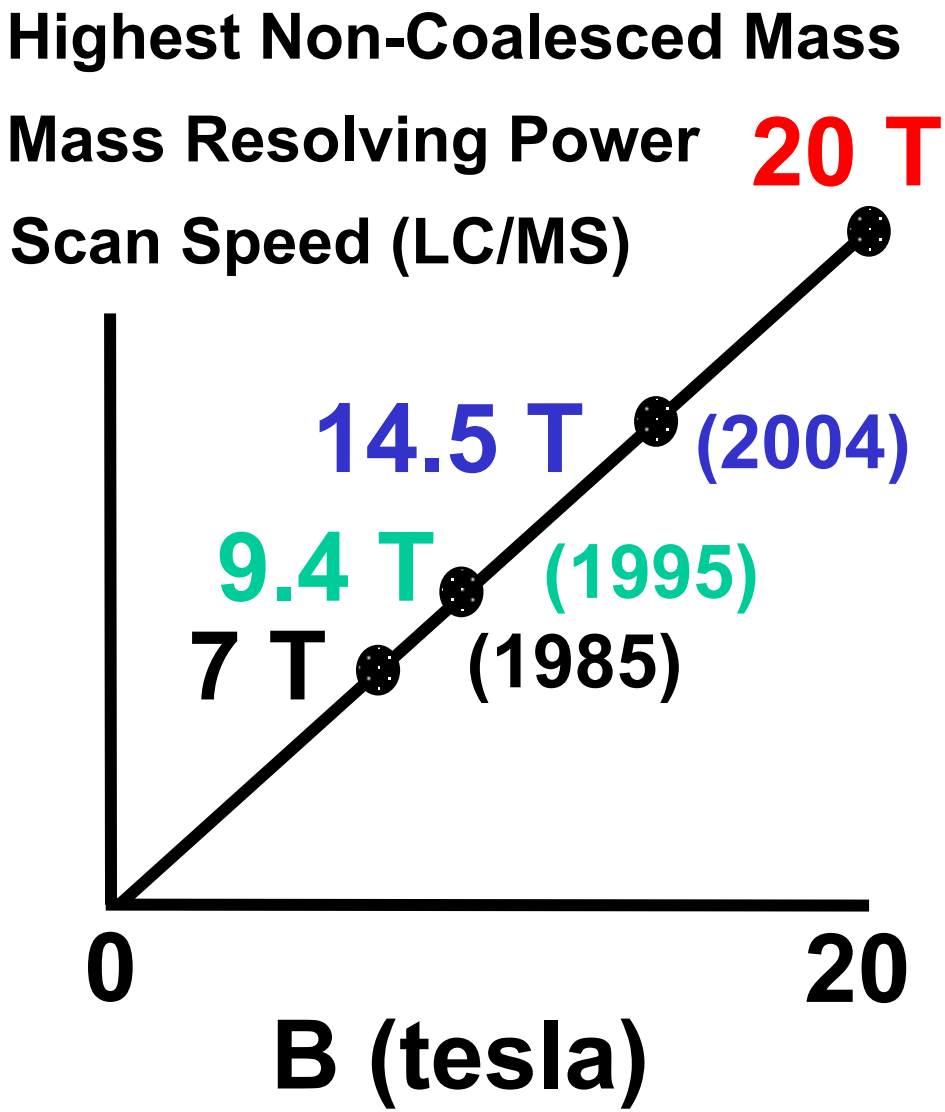
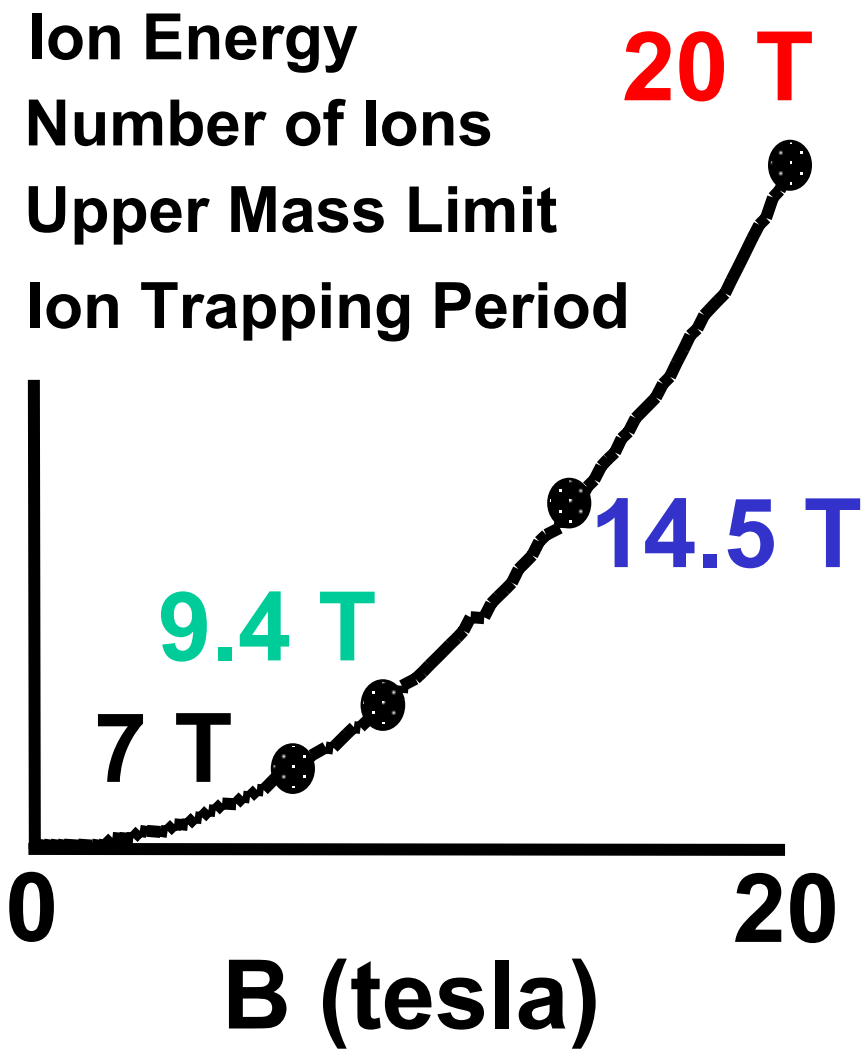
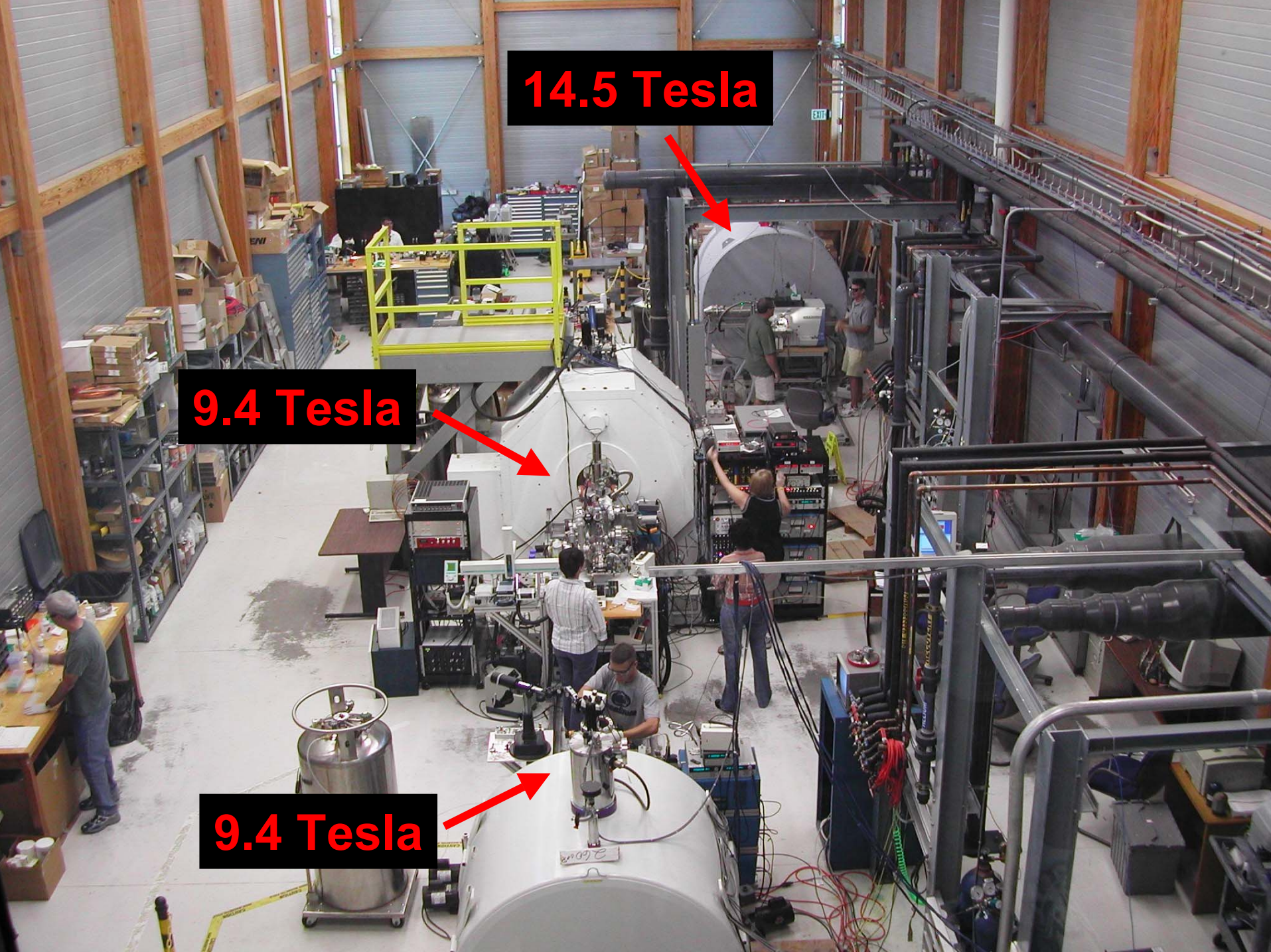
National High Magnetic Field Laboratory at Florida State University

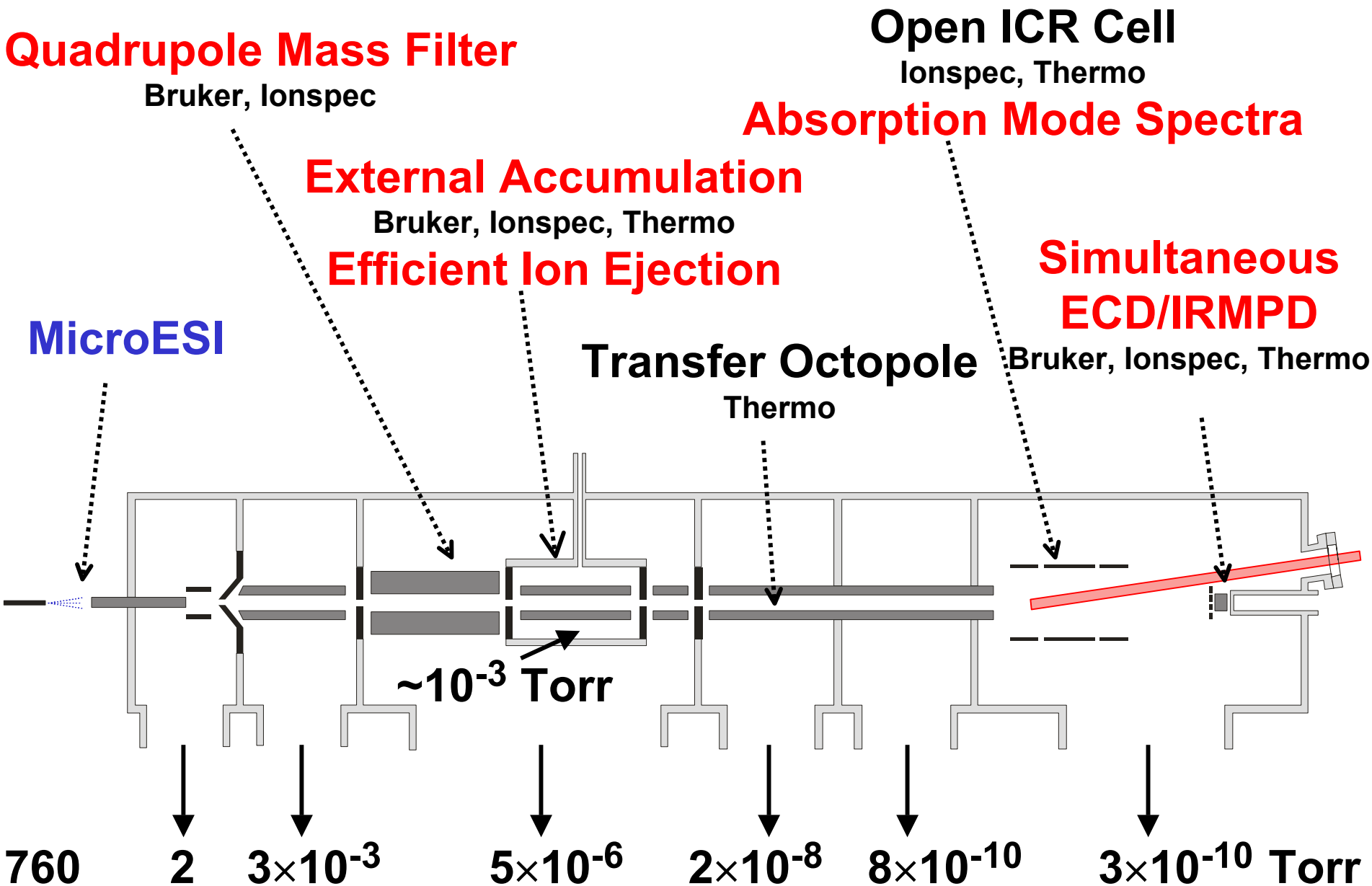


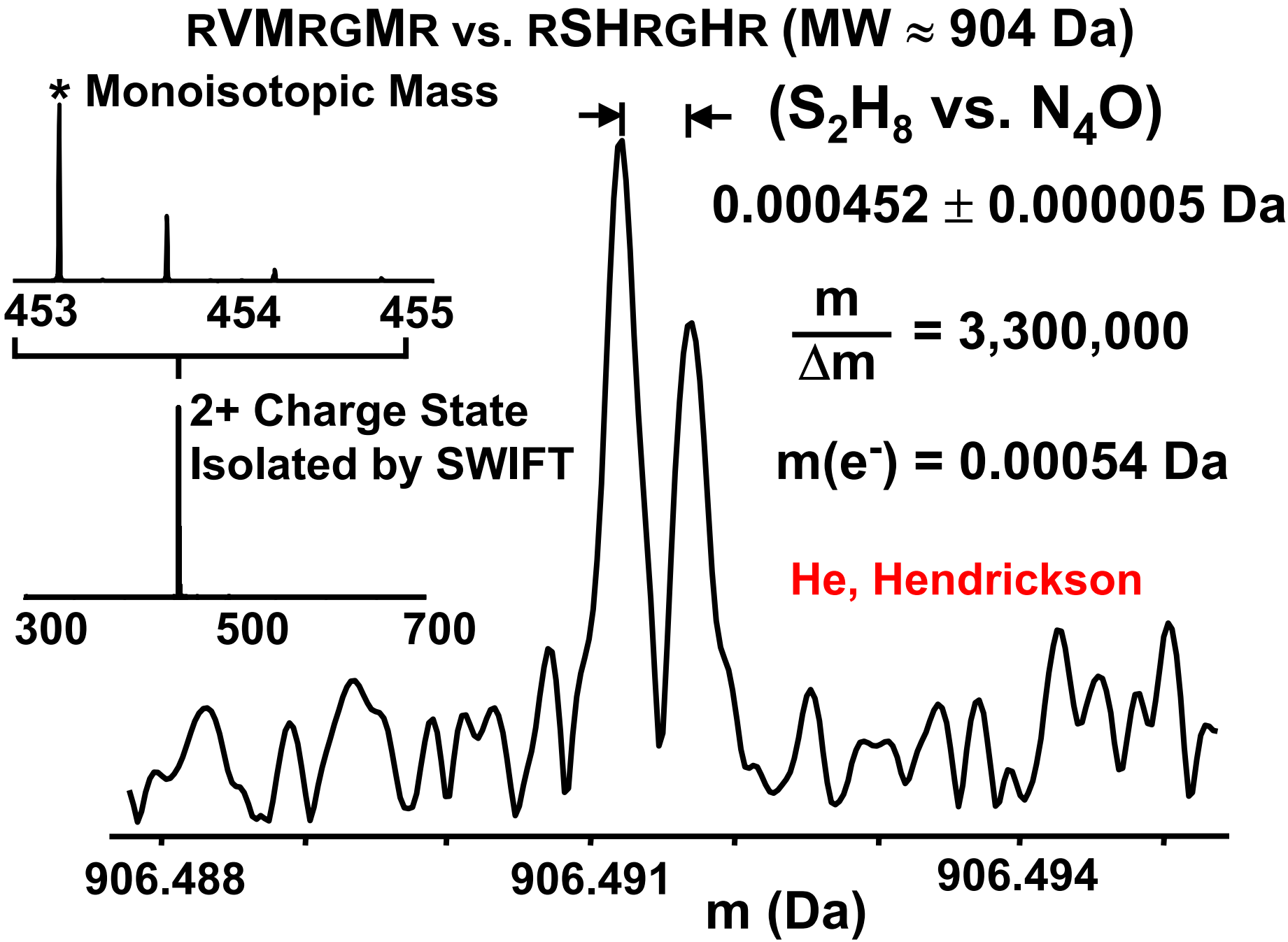

Highest Non-Coalesced Mass
Mass Resolving Power
Scan Speed (LC/MS)
20 T
14.5 T
(2004)
9.4 T
(1995)
7 T
(1985)
0
20
B (tesla)


Ion Energy
Number of Ions
Upper Mass Limit
Ion Trapping Period
20 T
14.5 T
9.4 T
7 T
0
20
B (tesla)


14.5 Tesla
9.4 Tesla
9.4 Tesla

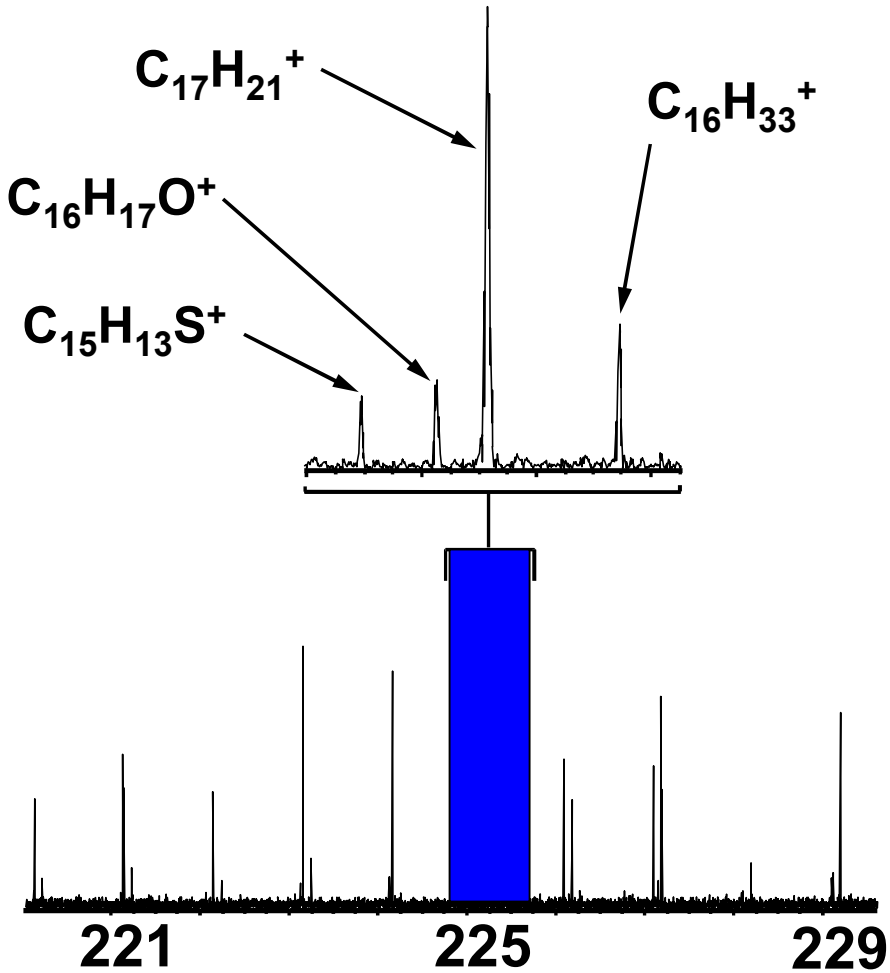
NHMFL Instrumentation Development



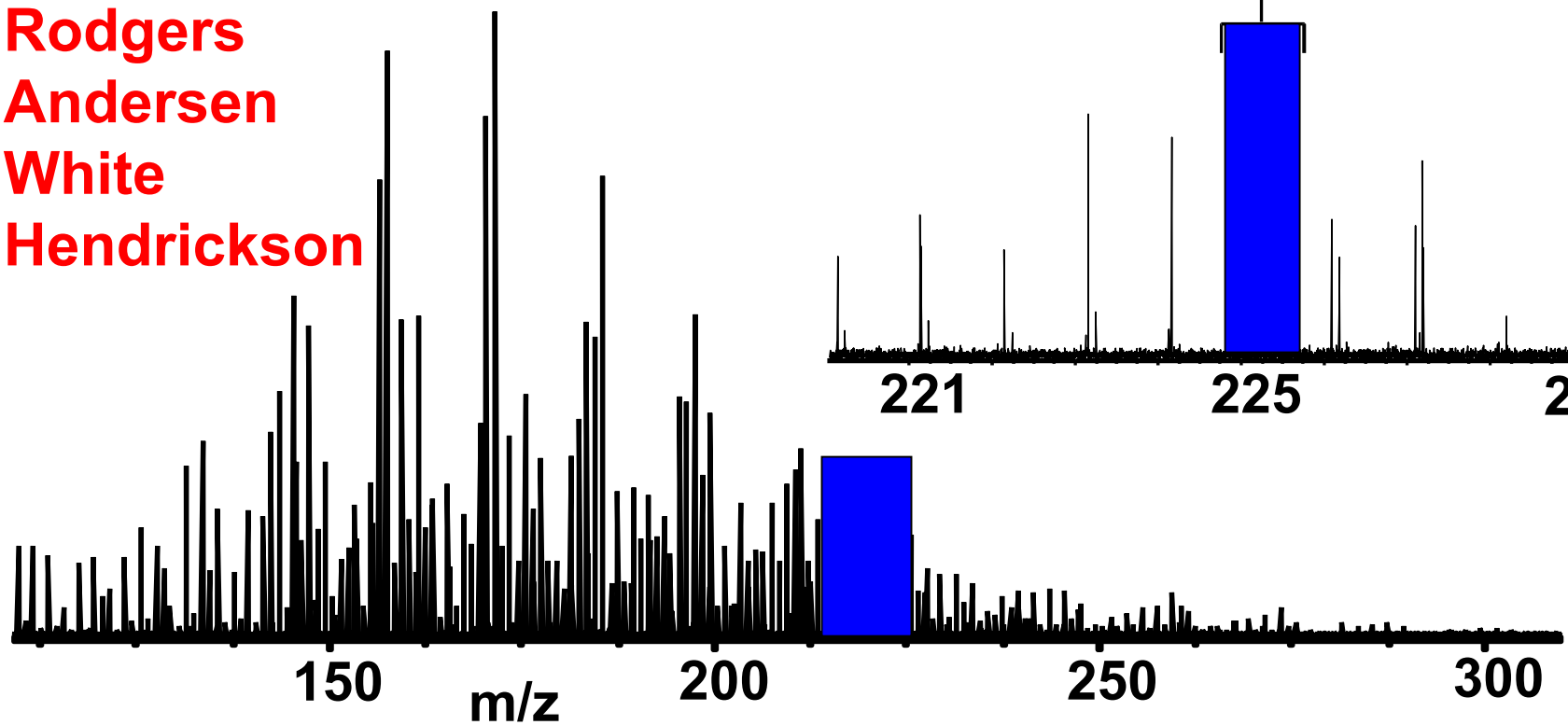

RVMRGMR vs. RSHRGHR (MW ≈ 904 Da)
* Monoisotopic Mass
453
454
455
2+ Charge State
Isolated by SWIFT
300
500
700
(S2H8 vs. N4O)
0.000452 ± 0.000005 Da
m / Δm = 3,300,000
m(e-) = 0.00054 Da
He, Hendrickson
906.488
906.491
906.494
m (Da)

Raw Diesel Feedstock
1μL Septum Injection

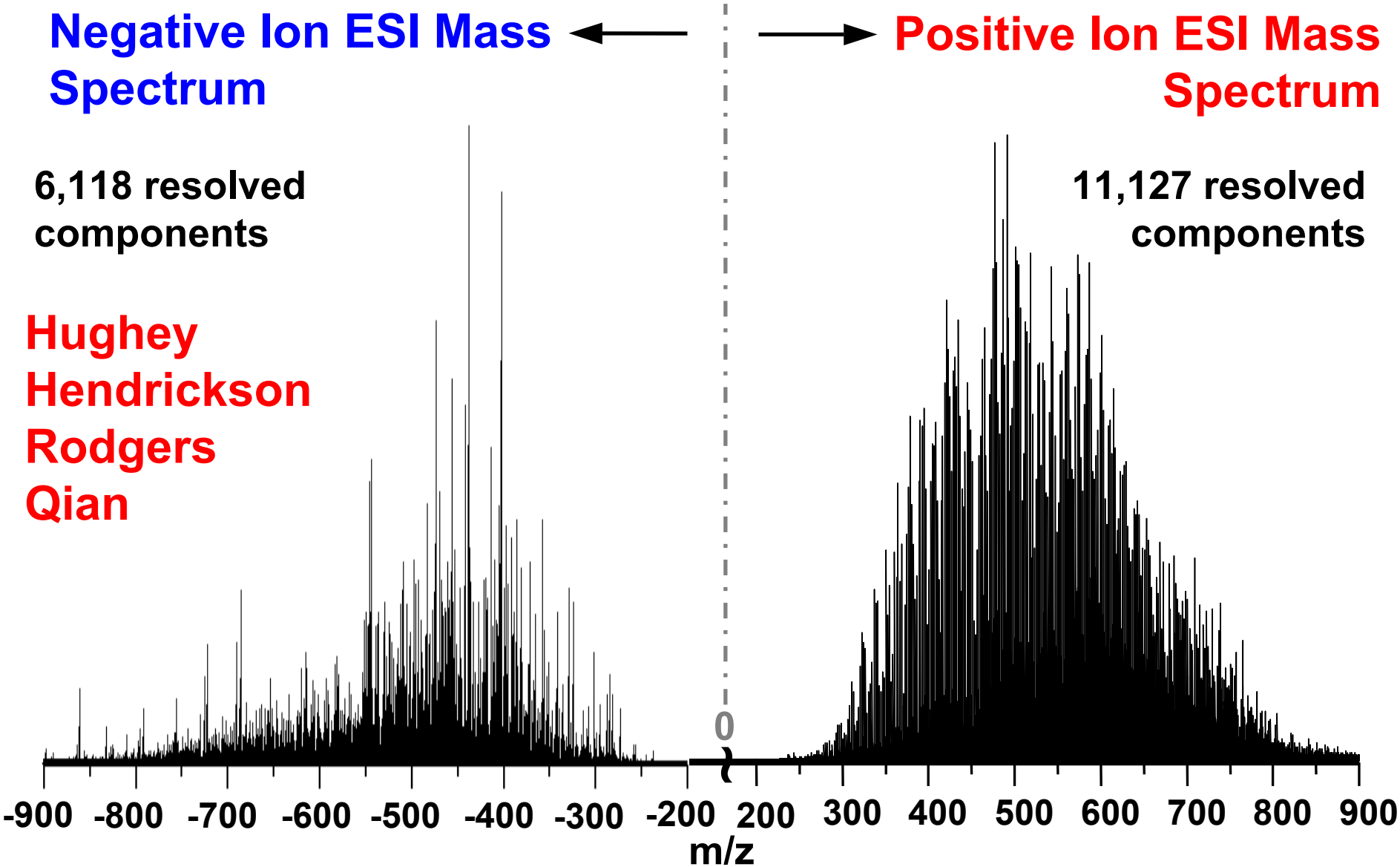
	Measured	Theoretical
$C_{15}H_{13}S^+$	225.07326	225.07325
$C_{16}H_{17}O^+$	225.12733	225.12739
$C_{17}H_{21}^+$	225.16375	225.16378
$C_{16}H_{33}^+$	225.25769	225.25768



Rodgers
Andersen
White
Hendrickson

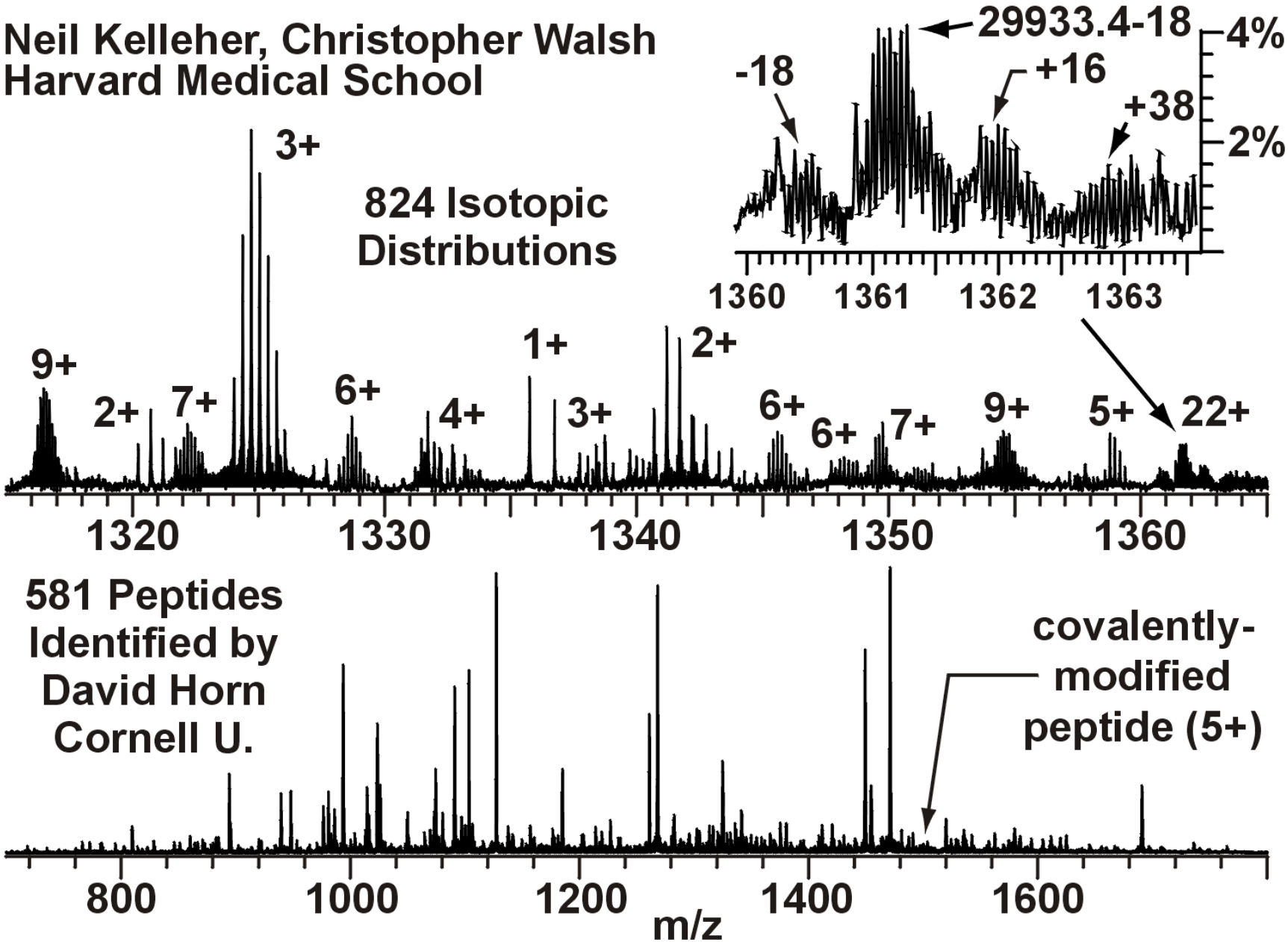


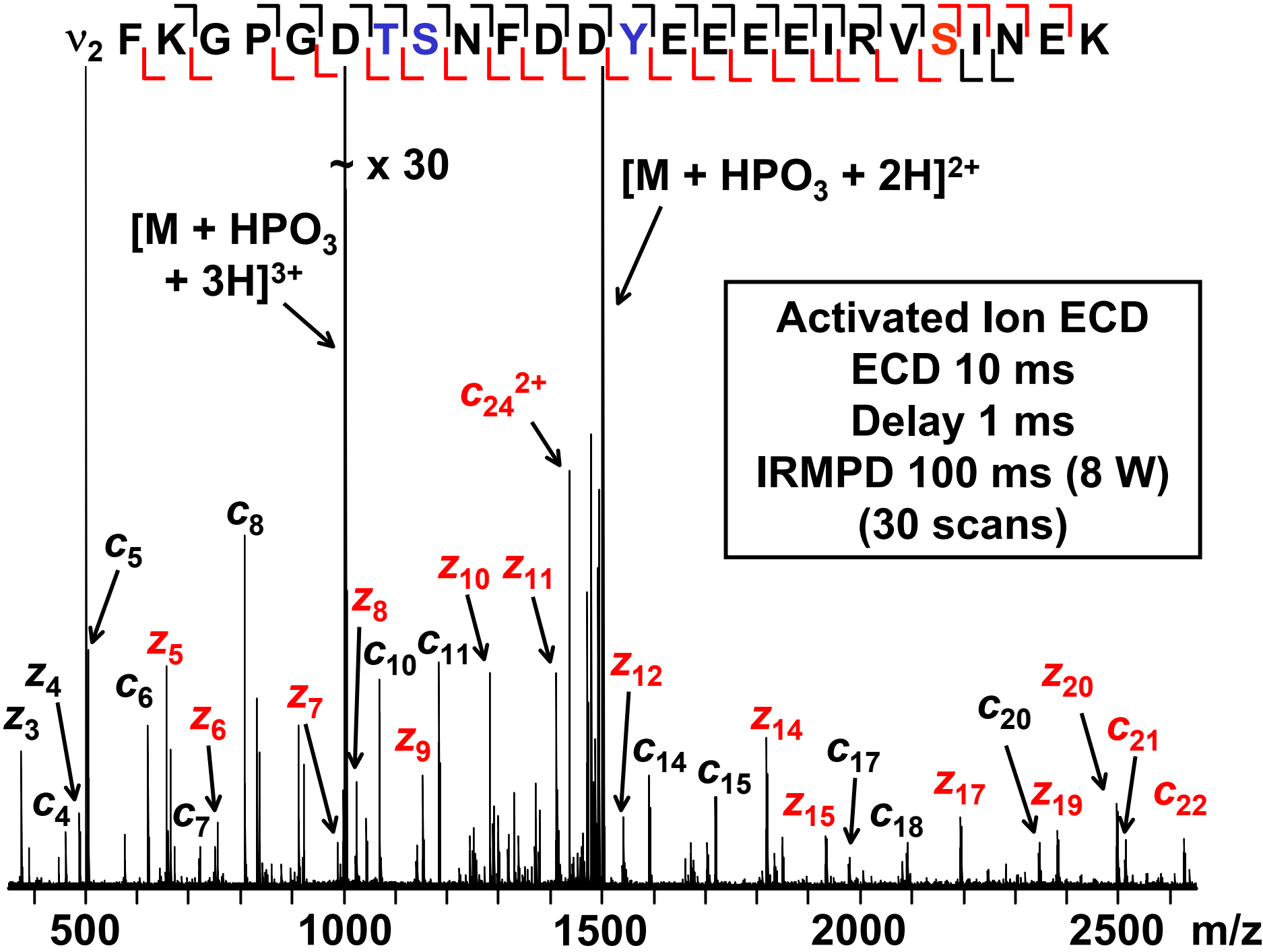
17,000+ Compositionally Distinct Components of S. Amer. Crude Oil Resolved by 9.4 Tesla Electrospray FT-ICR MS



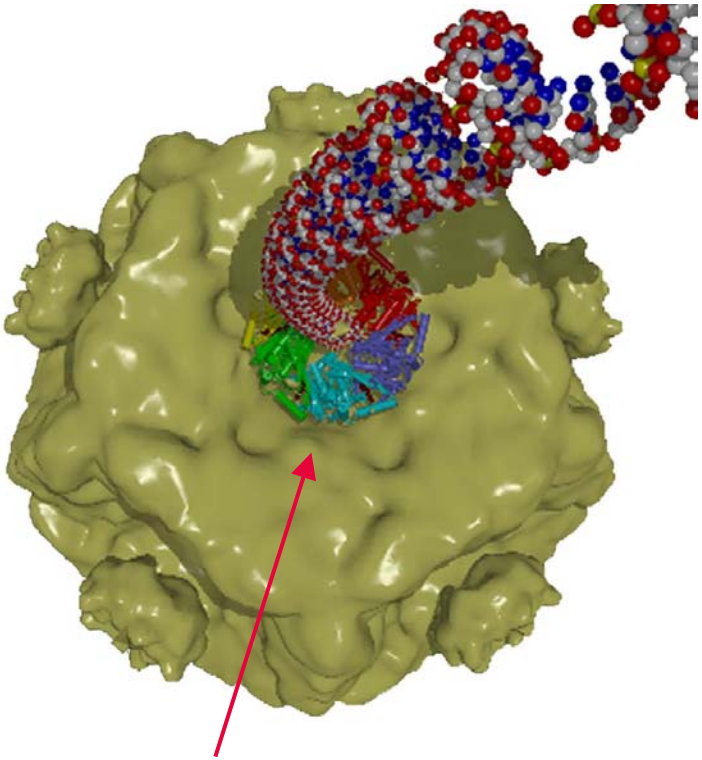
Unfractionated Glu-C Digest of a 191 kDa Protein

Neil Kelleher, Christopher Walsh
Harvard Medical School



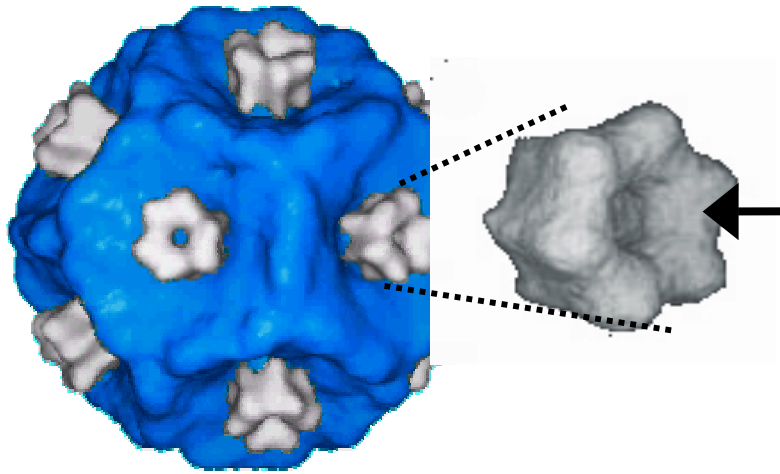

ν2 F K G P G D T S N F D D Y E E E E I R V S I N E K
~ x 30
[M + HPO3 + 3H]3+
[M + HPO3 + 2H]2+
Activated Ion ECD
ECD 10 ms
Delay 1 ms
IRMPD 100 ms (8 W)
(30 scans)
c24 2+
c8
c5
z10
z11
z8
z5
c10
c11
z12
z4
c6
z6
z7
z20
c20
z3
z9
z14
c21
c14
c17
c15
z17
c22
c4
c7
z15
c18
z19
500
1000
1500
2000
2500
m/z

Molecular Mechanism of RNA Packaging



Portal Vertex

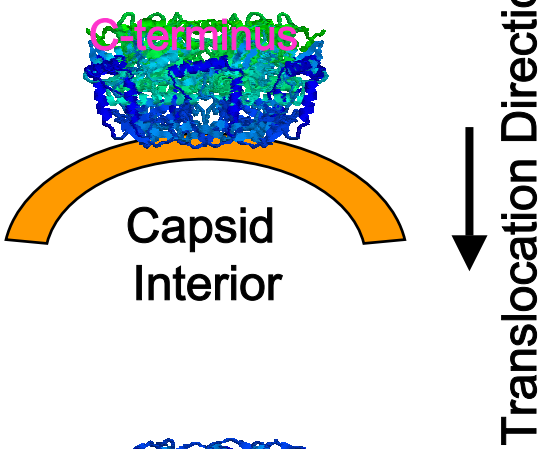
Hexameric
ATPase P4



Lam
Emmett
Lisal
Kainov
Tuma

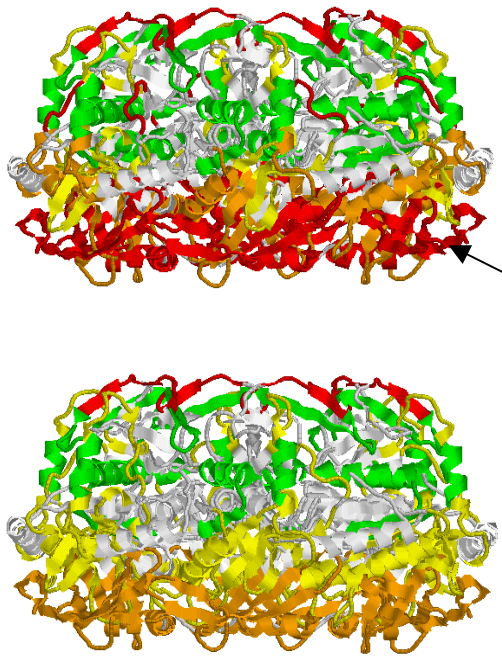
Orientation of P4 within its Procapsid

Apical Domain Associated with Procapsid



C-Terminus Associated with Procapsid

P4 Alone



P4 in Procapsid

C-terminus

Lam
Emmett
Lisal
Kainov
Tuma

H/D Exchange Rate

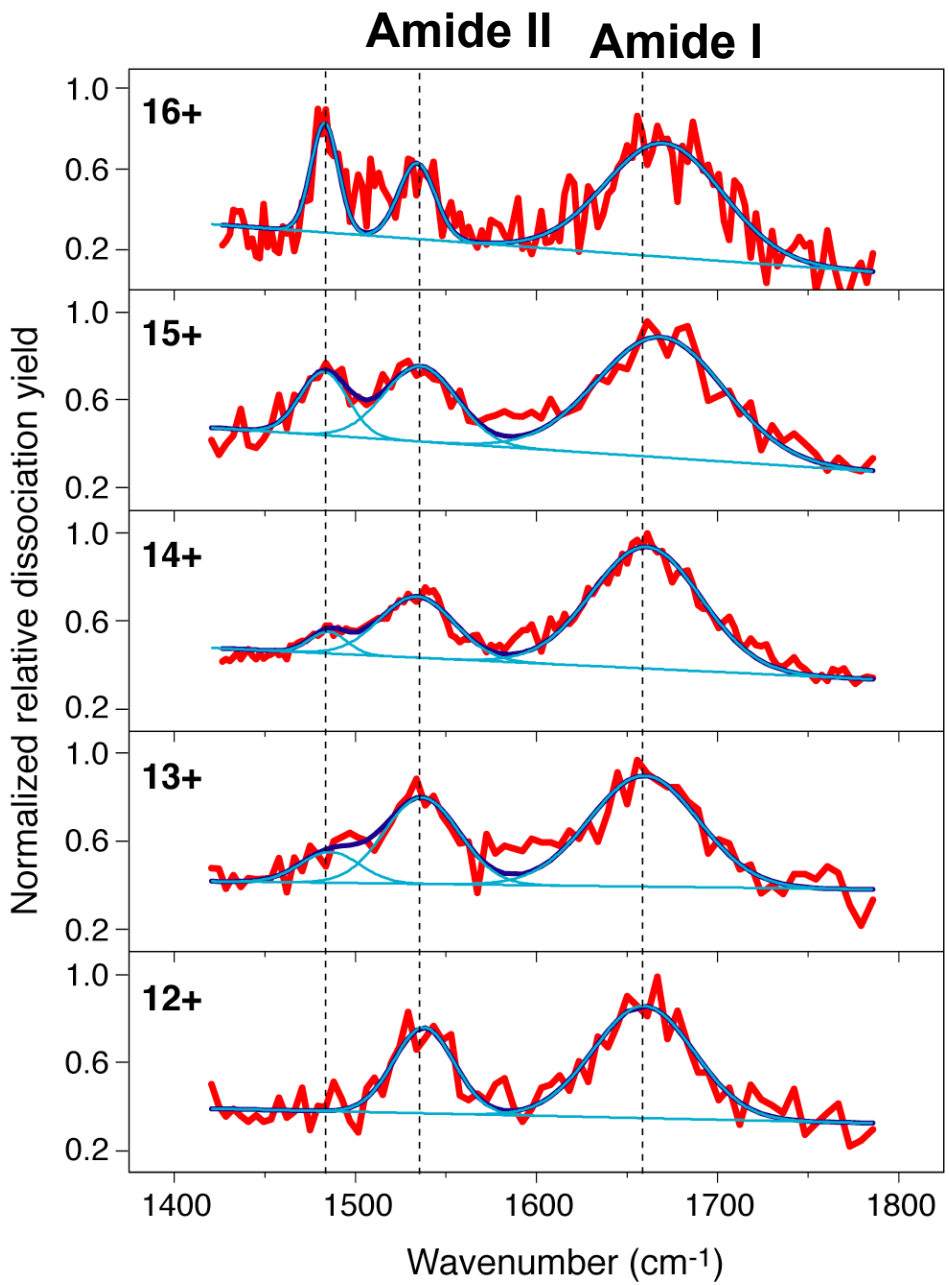
$< 0.1\ h^{-1}$

$0.1\ h^{-1} - 1\ h^{-1}$

$1\ h^{-1} - 10\ h^{-1}$

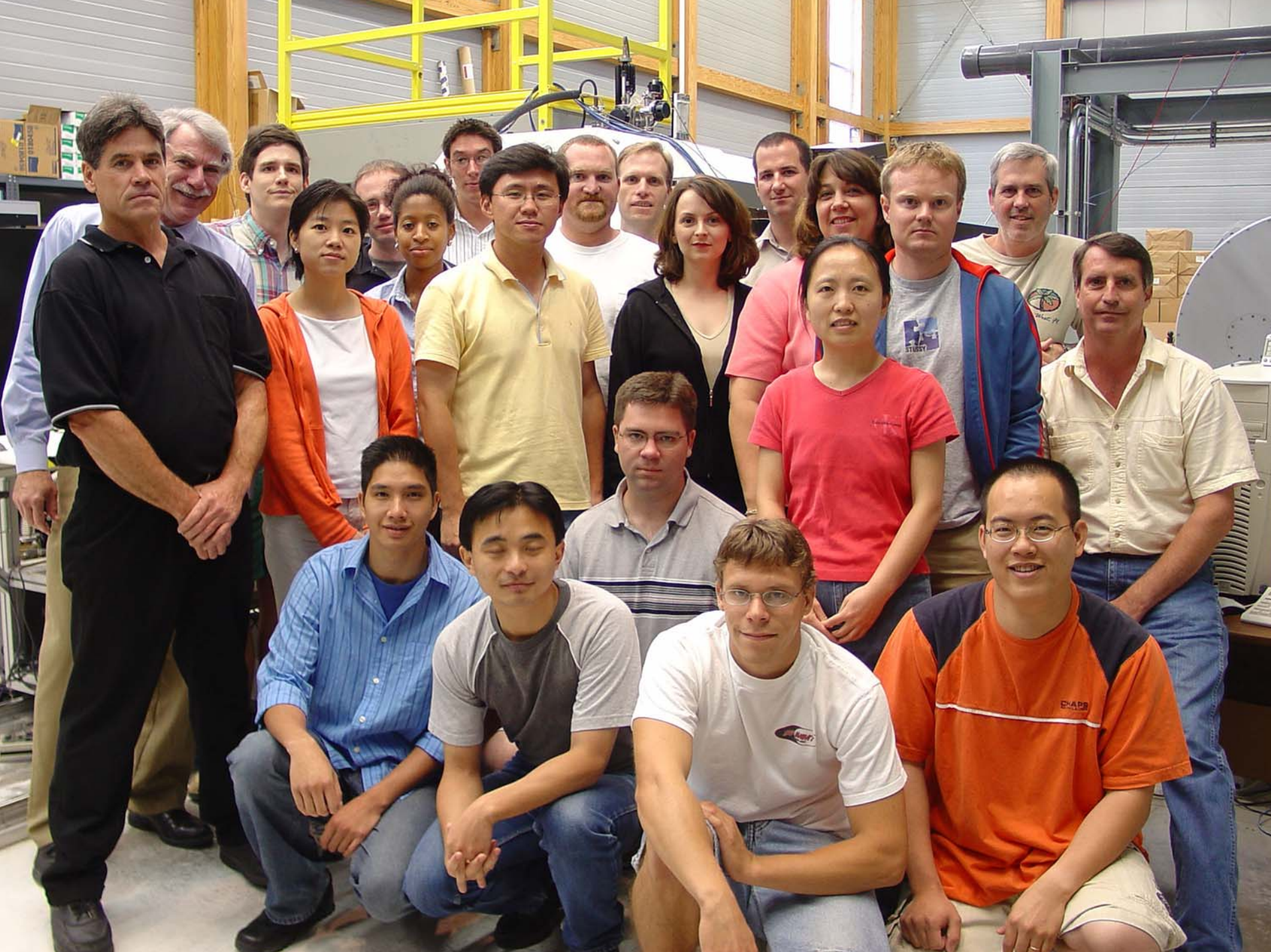
$10\ h^{-1} - 100\ h^{-1}$

$> 100\ h^{-1}$

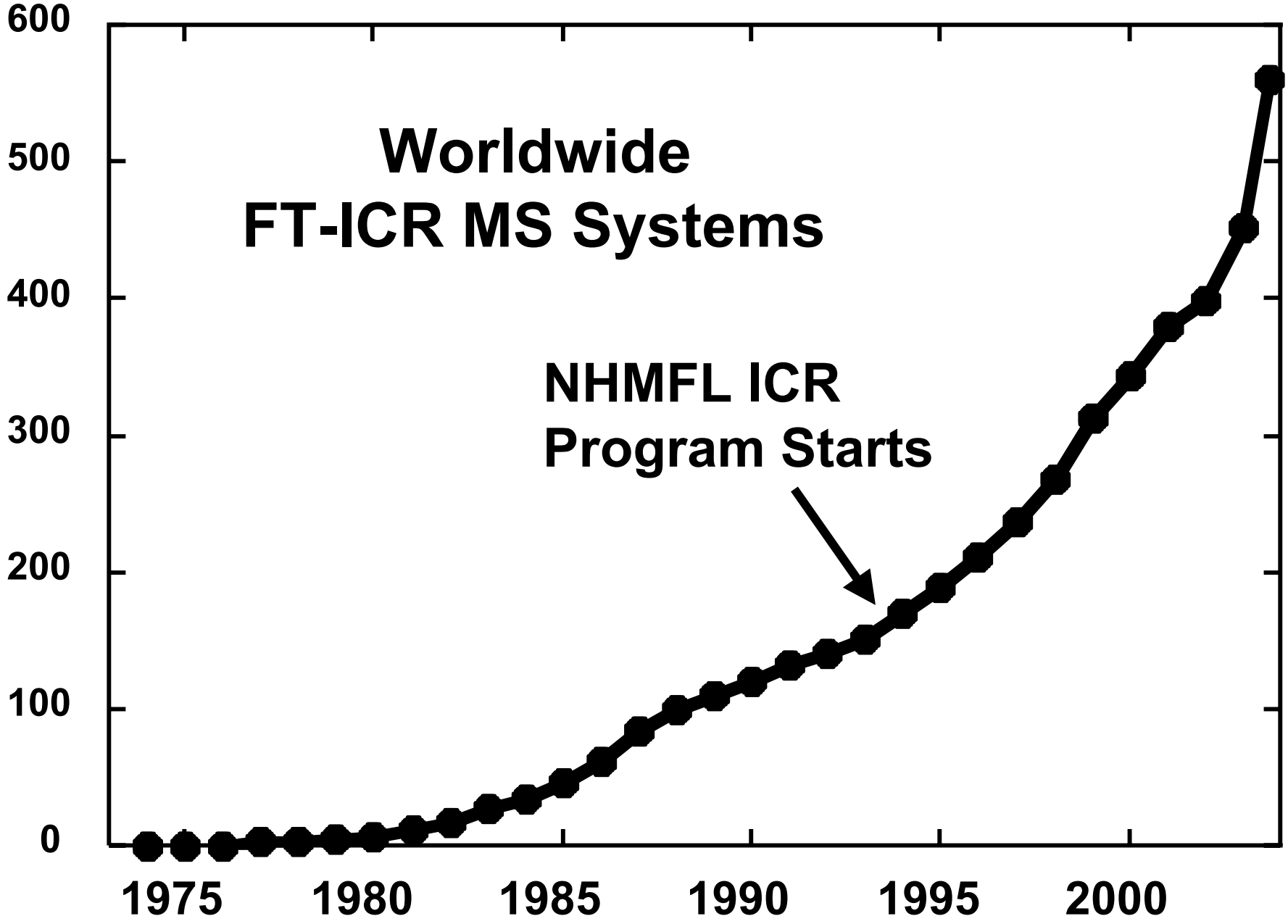


Bovine Cytochrome *c*

von Helden
Oomens
Polfer
Moore
van der Meer
Eyler
Meijer



5th N. Amer. FT-ICR MS Conference
Key West, FL 17-20 April, 2005


Worldwide
FT-ICR MS Systems
NHMFL ICR
Program Starts
600
500
400
300
200
100
0
1975
1980
1985
1990
1995
2000