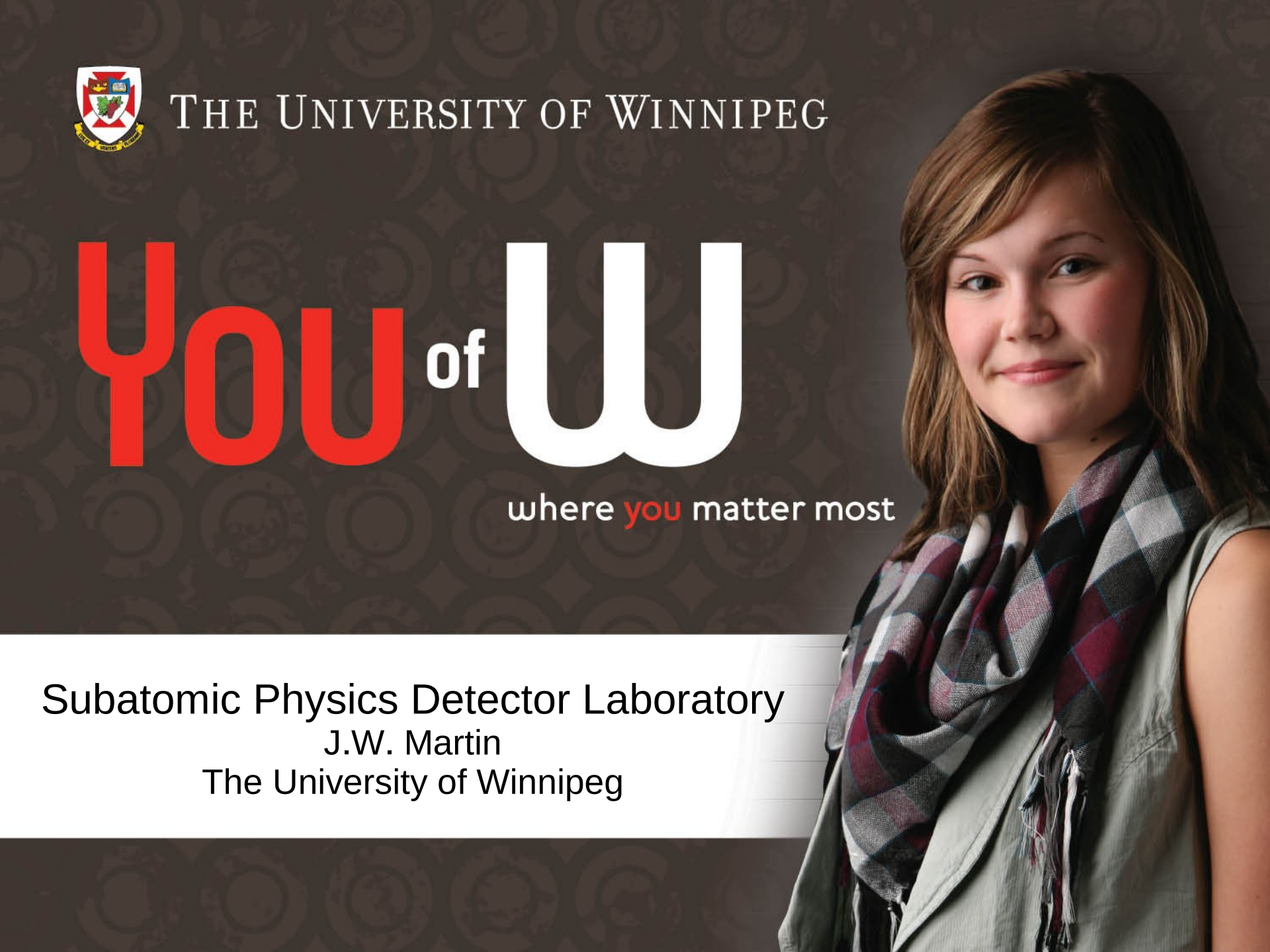
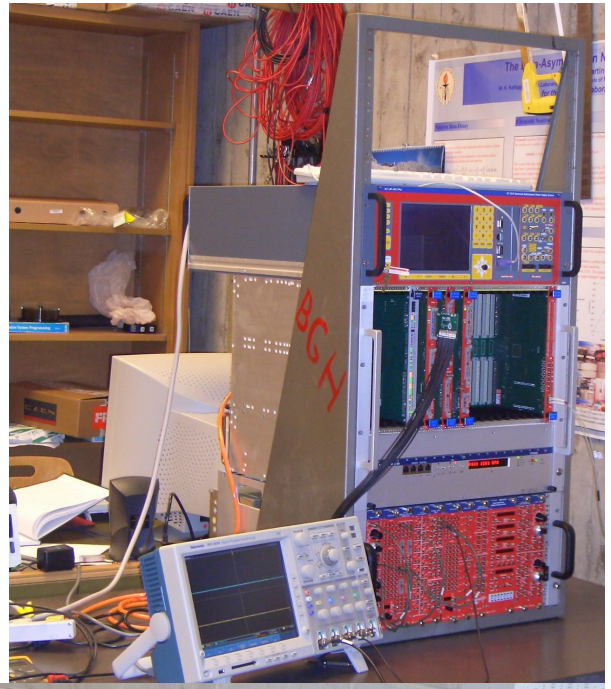



# Subatomic Physics Detector Laboratory

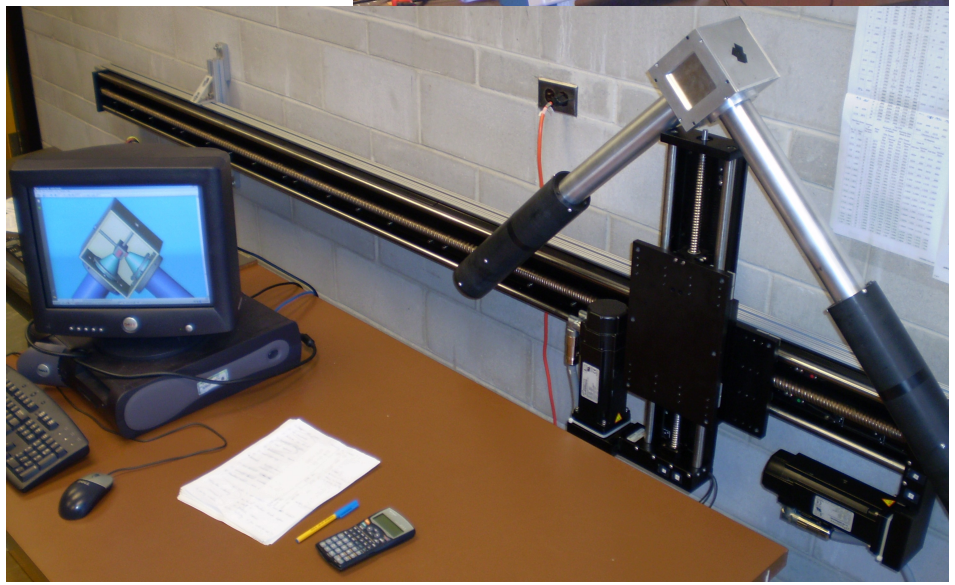
J.W. Martin
The University of Winnipeg

# Subatomic Physics Detector Laboratory
## J.W. Martin CFI LOF 2006

Canada Foundation for Innovation
Fondation canadienne pour l'innovation



- Design, construction and testing of particle detectors for physics experiments
- Two detector projects funded by NSERC nearing completion
- Trainees (since 2006): one postdoc, four grad students, and six undergraduates
- Local linkages created since 2006:
  - Nanosystems Fabrication Lab at UM EE (CFI, C. Shafai)
  - Detector Lab at UM Physics (CFI, M. Gericke)
  - PET at HSC (A. Goertzen)
  - Acsion Industries (Pinawa, MB)
- Immense impact on large international science collaborations searching for new physics beyond the standard model.



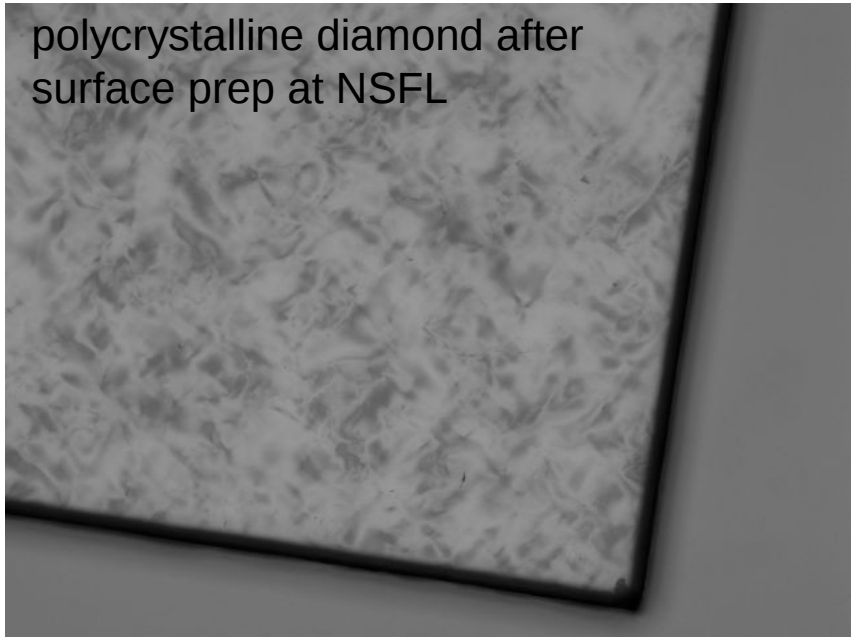
NSERC CRSNG

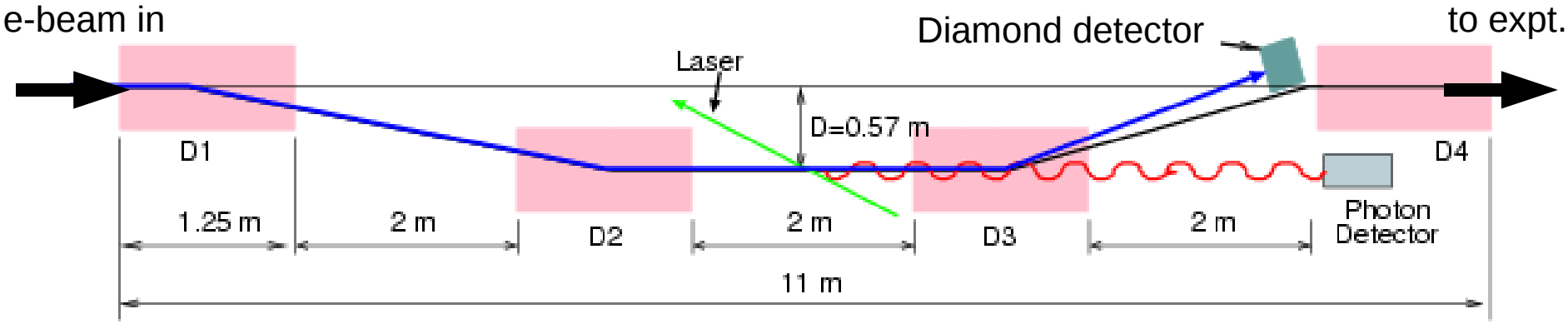
# Diamond Detectors for Subatomic Physics

J.W. Martin et al, U. Winnipeg

Canada Foundation for Innovation
Fondation canadienne pour l'innovation
NSERC CRSNG

- Detectors of ionizing radiation for electron beam polarimeter for "Q-weak experiment", Jefferson Lab, Newport News, VA.
  - 100 collaborators from Canada, US, Mexico, Armenia, Croatia
- Synthetic diamond used as a semiconductor detector (e-h pair creation)
  - fast response, low noise
  - very radiation-hard
- Careful surface prep, and lithography to get ohmic contacts in strips with pitch of 200 um for position sensitivity.
- All prototyping was done in Winnipeg!



Leadership of international collaborations enabled by CFI.
U. Winnipeg submission for this year's CFI NIF competition.

TRIUMF

CANADA'S NATIONAL LABORATORY FOR PARTICLE AND NUCLEAR PHYSICS

*Owned and operated as a joint venture by a consortium of Canadian universities via a contribution through the National Research Council Canada*

# Canadian Spallation Ultracold Neutron Source


Spokesperson: J.W. Martin (U. Winnipeg)

Collaborators: J.D. Bowman, J. Birchall, L. Buchmann, L. Clarke, C. Davis, B.W. Filippone, M. Gericke, R. Golub, K. Hatanaka, M. Hayden, T.M. Ito, S. Jeong, I. Kato, S. Komamiya, E. Korobkina, E. Korkmaz, L. Lee, Y. Masuda, K. Matsuta, A. Micherdzinska, W.D. Ramsay, S.A. Page, B. Plaster, I. Tanihata, W.T.H. van Oers, Y. Watanabe, S. Yamashita, T. Yoshioka

(Winnipeg, Manitoba, ORNL, TRIUMF, NCSU, Caltech, RCNP, SFU, LANL, KEK, Tokyo, UNBC, Osaka, Kentucky)


*LABORATOIRE NATIONAL CANADIEN POUR LA RECHERCHE EN PHYSIQUE NUCLÉAIRE ET EN PHYSIQUE DES PARTICULES*

*Propriété d'un consortium d'universités canadiennes, géré en co-entreprise à partir d'une contribution administrée par le Conseil national de recherches Canada*

We propose to construct the world's highest density source of ultracold neutrons and use it to conduct fundamental and applied physics research using neutrons.

# Benefits to Canada

- My science is discovery science.
- Basic discoveries are the cornerstone of every modern convenience in our lives today.
  - e.g. Positron emission tomography: first scan in province of Manitoba 2005. Cyclotron to operate soon.
  - Developed by nuclear chemists of the 1970's.
  - Positron discovered by subatomic physicists of the 1930's.
- Leadership in basic science leads to new industries and hence to economic prosperity.
- HQP: Our people are our power.
  - One postdoc (attracted to Winnipeg from US by CFI infra)
  - Four grad students
  - Six undergraduates (2 x NSERC USRA, 3 undergrad theses)


THE UNIVERSITY OF WINNIPEG