Industry and Science: POSCO and POSTECH Case

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Pohang Accelerator Laboratory (PAL)
Pohang University of Science and Technology (POSTECH)
Pohang 790-784, Korea

Funding to Pohang Light source (PLS)

	Government	POSCO (POSTECH)
• Construction (1988-1994)	45%	55%
• Operations (1995-2012)	80%	20%

Outline

- Brief Facts about Korea
- Pohang Steel and Iron Company (POSCO)
- Pohang University of Science and Technology (POSTECH)
- Pohang Accelerator Laboratory (PAL)
- Large-scale Science Projects in Korea
- Summary

Brief Facts about Korea

People & Language: Korean (~4,500 yrs in the area)
Area (South)**:** ~100,000 km^2 (~38,000 sq. mi.)
Population (South)**:** ~50 million

Recent History:

1945: Divided into North and South
1950~1953: Korean Conflict
1960~1970: Modernization (Migration to cities)
1970~1980: Industrialization (Heavy Industries)
1990~2008: High-tech oriented

Leading Industries:

Electronics, Steel, Ship-building, Automobile, Chemicals, Construction, Textiles

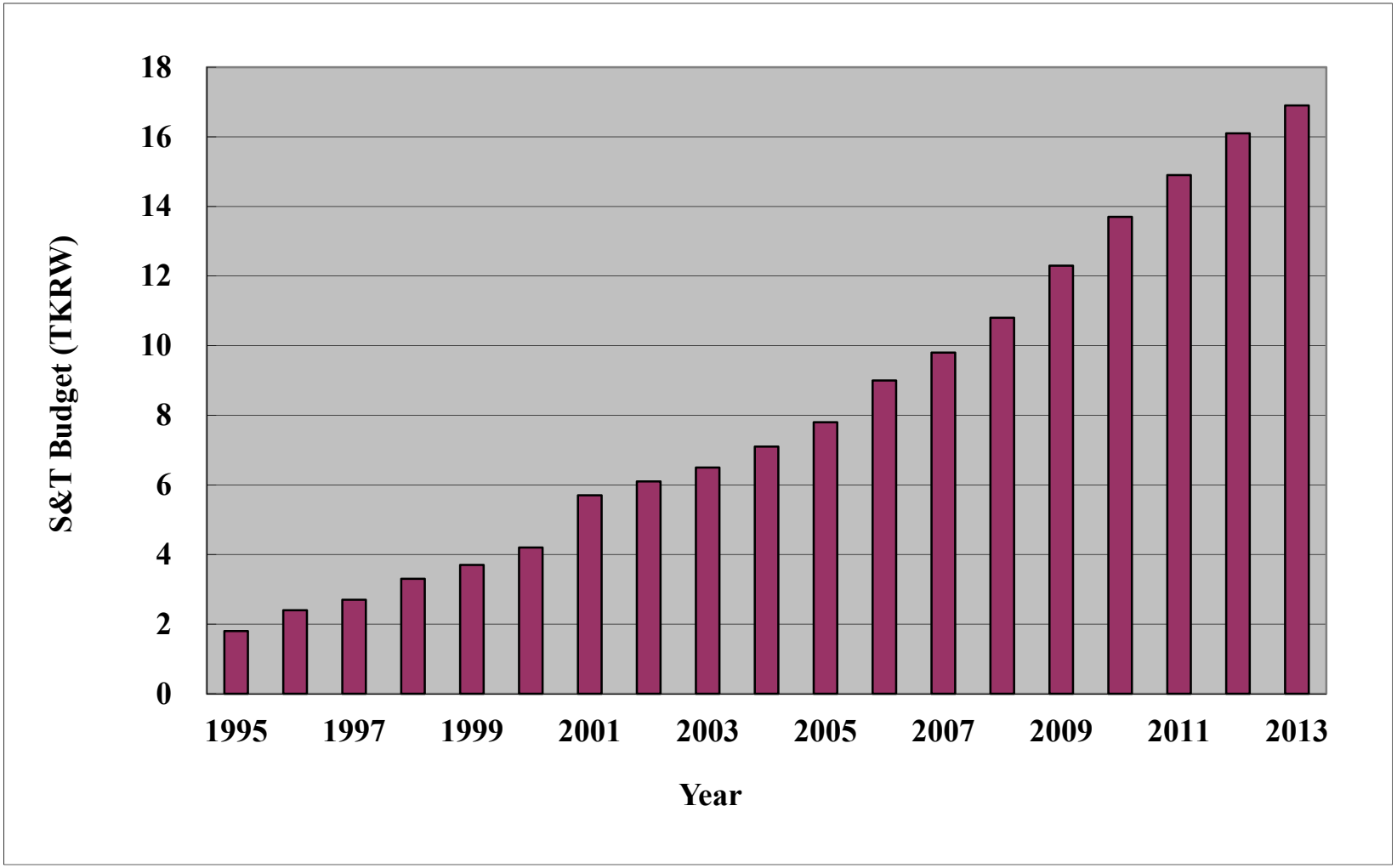
Economy: GDP = 1.1 T$, ~22.0 k$/capita in 2012
Religion: Christian (~30%), Buddhism (~30%)
Education: > 80% high-school seniors go to college

Big Three Companies in Korea

	Main Business	2012 Revenue	Business Profit	Net Profit
Samsung	Electronics	237.0 B$	38.4 B$	31.6 B$
Hyundai Motors	Auto	87.7 B$	8.7 B$	9.3 B$
POSCO	Steel	63.8 B$	3.8 B$	2.7 B$

Note: POSCO's	Revenue	Business Profit	Net Profit
2010	48.0 B$	5.4 B$	4.2 B$
2011	69.0 B$	5.4 B$	3.7 B$

Science and Technology Budget in Korea



POSCO Plants in Pohang & Gwangyang

Pohang Works

Gwangyang Works

Established:	1968	
Employees:	17,500	(2012)
Steel Production:	38 M Tons	(2012)
Revenue:	63.6 B$	(2012)
Net Profit:	2.7 B$	(2012)

4th largest and best steel company in the world

Two Founding Fathers in Pohang

POSCO Chairman, Tae-joon Park
(1927-2011)

POSTECH President, Hogil Kim
(1933-1994)

Statistics of POSTECH

Departments:

Undergraduate: **1,300** Students in 11 Departments and 1 Faculty

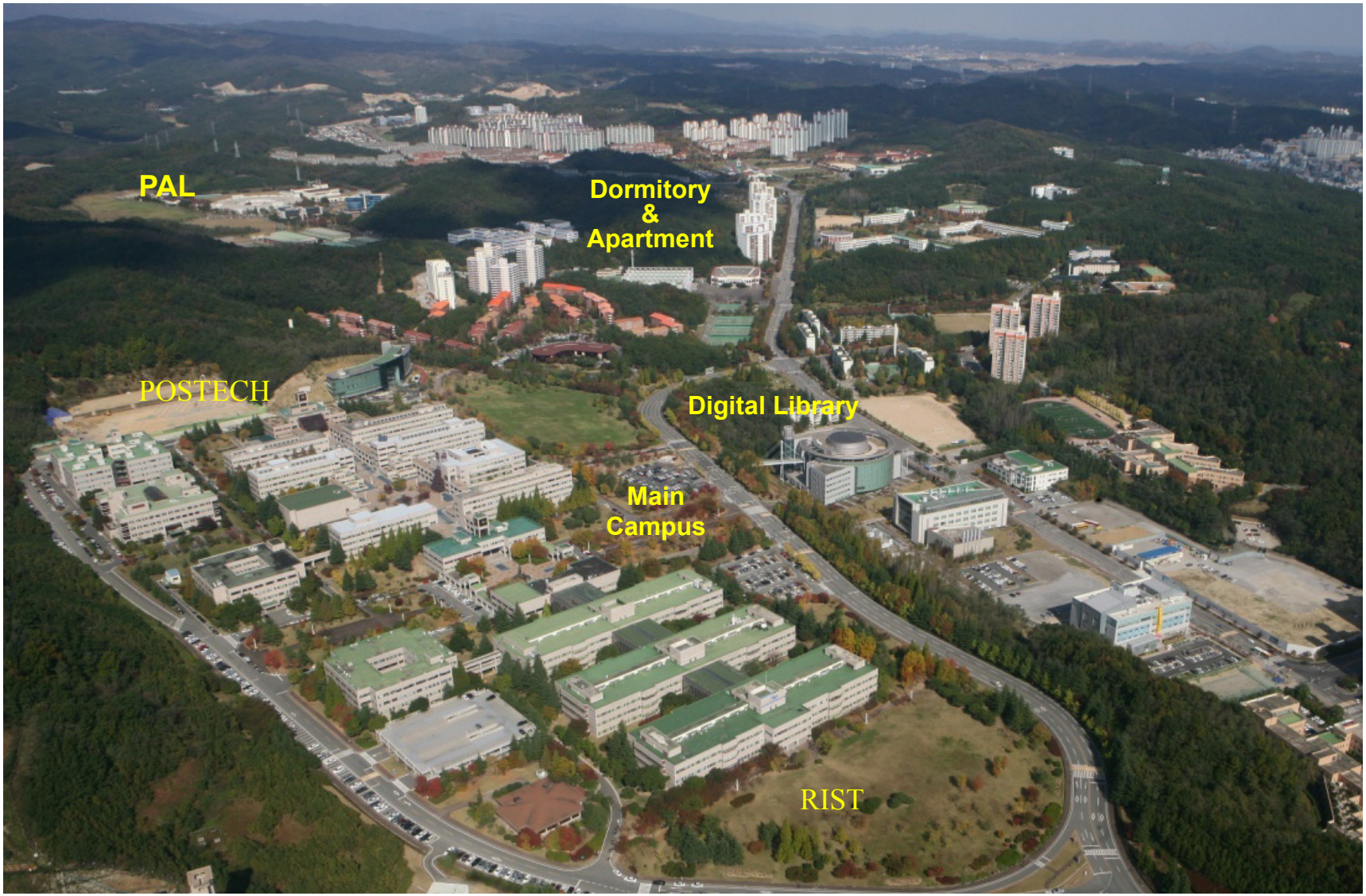
Graduates: **2,130** Students
6 Departments, 7 Faculties,
5 Joint Programs, 3 Professional, and 1 Special

Faculty Members:

269 Professors and 160 Adjunct Prof. and Lecturers
764 Research Staff
243 Administration

Campus size: 1.6 million m^2 (413 Acres) including PAL of 0.65 M m^2

POSTECH Campus and PAL



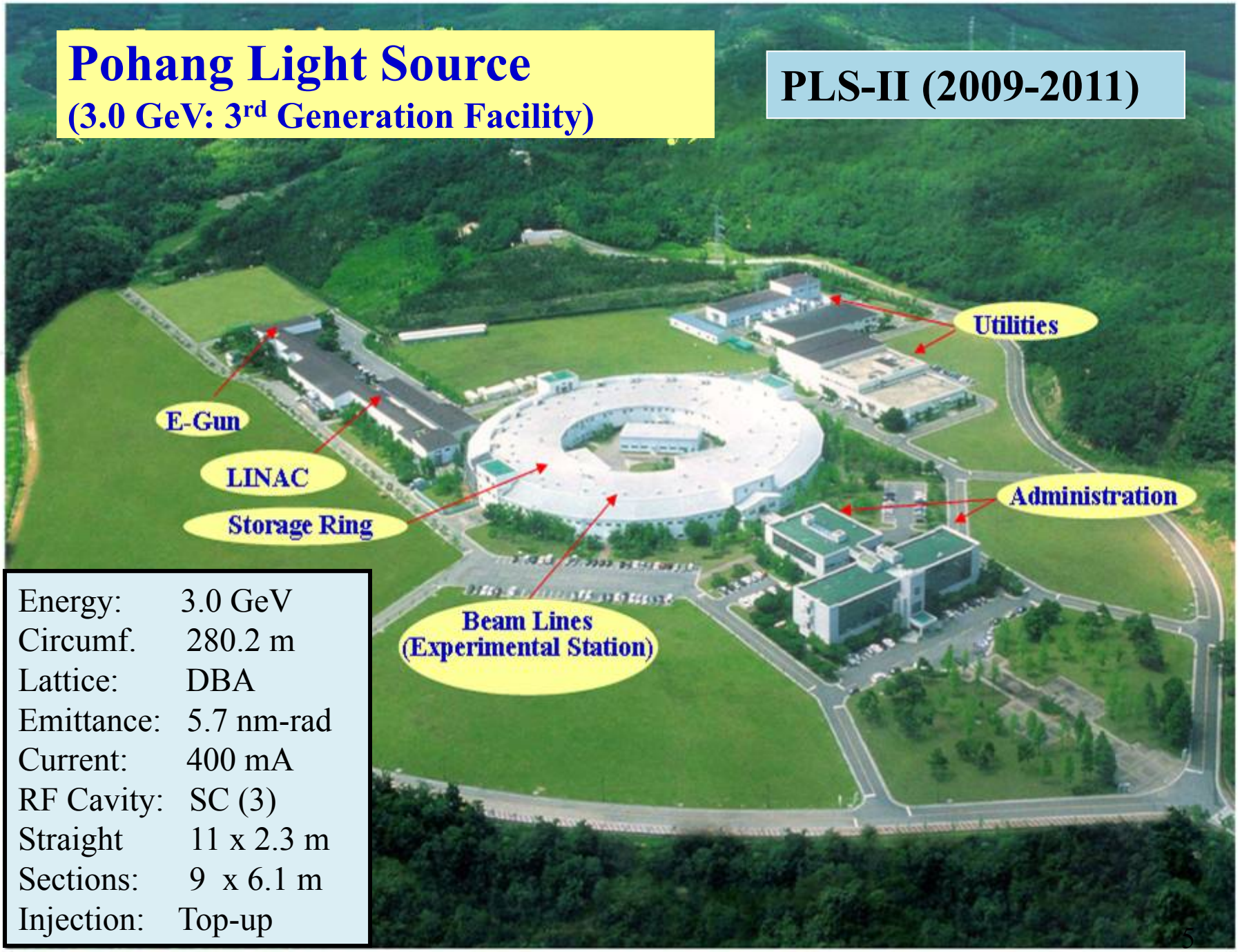
Ranking by Times Higher Education in Oct. 2012

Ranking		University	Country / Region
U50	WUR		
1	**53**	**POSTECH**	**Korea**
2	46	École Polytechnique Fédérale de Lausanne	Switzerland
3	62	HKUST	Hong Kong
4	86	University of California, Irvine	United States
5	94	KAIST	Korea
6	84	Université Pierre et Marie Curie	France
7	110	University of California, Santa Cruz	United States
8	121	University of York	United Kingdom
9	131	Lancaster University	United Kingdom
10	145	University of East Anglia	United Kingdom

PLS Project at POSTECH by POSCO

Pohang Light Source
(3.0 GeV: 3rd Generation Facility)

PLS-II (2009-2011)



Energy:	3.0 GeV
Circumf.	280.2 m
Lattice:	DBA
Emittance:	5.7 nm-rad
Current:	400 mA
RF Cavity:	SC (3)
Straight	11 x 2.3 m
Sections:	9 x 6.1 m
Injection:	Top-up

Artistic View of 10.0-GeV PAL-XFEL

Inject Test Facility for PAL-XFEL

Site Preparation in May 2013

PAL-XFEL Ground-breaking Ceremony on May 9, 2013

Large-scale Science Programs in Korea

Accelerators:	
PLS - *Light Source:*	1988 - 1994
KOMAC - *Proton Linac:*	2002 - 2012
PLS-II - *Light source upgrade:*	2009 - 2011
PAL-XFEL - *X-ray Laser:*	2011 - 2015
KoRIA- *Rare Isotopes*:	2011 - 2017
KHIMA- *Carbon Therapy*:	2011 -2017
Fusion and Reactor facilities:	
Hanaro - *Research Reactor:*	1988 - 1994
KSTAR - *Fusion Tokamak:*	1996 - 2008
ITER-Korea - *ITER member:*	2006 - 2019

Korean Companies for Fusion and Accelerators

For KSTAR,
Total 69 companies

Summary

At the main gate of Pohang works,

"Resources are limited, Creativity is Unlimited"

- Founding fathers in Pohang were successful in POSCO, one of the best steel company in the world, and they emphasized higher education for the future vision.
- Established POSTECH, and it becomes one of best universities.
- POSTECH built PLS with POSCO and government supports
- PLS obtained credits for large-scale scientific facilities
- 3.0-GeV PLS-II is in now operation, and
  10.0 GeV PAL-XFEL is under construction.

Presentations for PLS-II and PAL-XFEL at IPAC'13

MOPEA048	M.-H. Chun, "Operation Status of RF System for PLS-II Storage Ring"
MOPEA049	S. H. Nam, "First Year Experience of PLS-II"
MOPME061	H. S. Kang, "Femtosec e-bunch length at fs-THz Accelerator at PAL"
WEODB103	H. S. Kang, "Current Status of PAL-XFEL"
WEPFI044	J. D. Joo, "High Power Test of New SLED System"
WEPFI045	H. S. Lee, "PAL-XFEL Accelerator Structure"
WEPME036	K.-H. Park, "LLRF System Developed at PAL"
WEPWA040	J. H. Han, "Options for Operation Conditions of PAL-XFEL Injector"
WEPWA041	J. H. Han, "First Beam Measurements at PAL-XFEL Injector"
WEPWA043	S. J. Park, "Construction of Injector Test Facility for PAL-XFEL"
WEPWO041	Y. U. Sohn, "Beam Commissioning of SC RF Cavities at PLS-II"
THPME026	D. E. Kim, "Field Measurements of PAL-XFEL Undulators"
THPME027	H. G. Lee, "Fabrication of Prototype Phase Shifter for PAL-XFEL"

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BEXCO
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Pohang Accelerator Laboratory (PAL)

Co-host
Korea Multi-Purpose Accelerator Complex (KOMAC)
Korea Institute of Radiological & Medical Sciences (KIRAMS)
Rare Isotope Science Project (RISP)

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