

3rd Immersion Workshop

27th January 2004
Hyatt Regency at Macy's Plaza
Los Angeles, California USA

Opening Remarks

Walt Trybula, ISMT



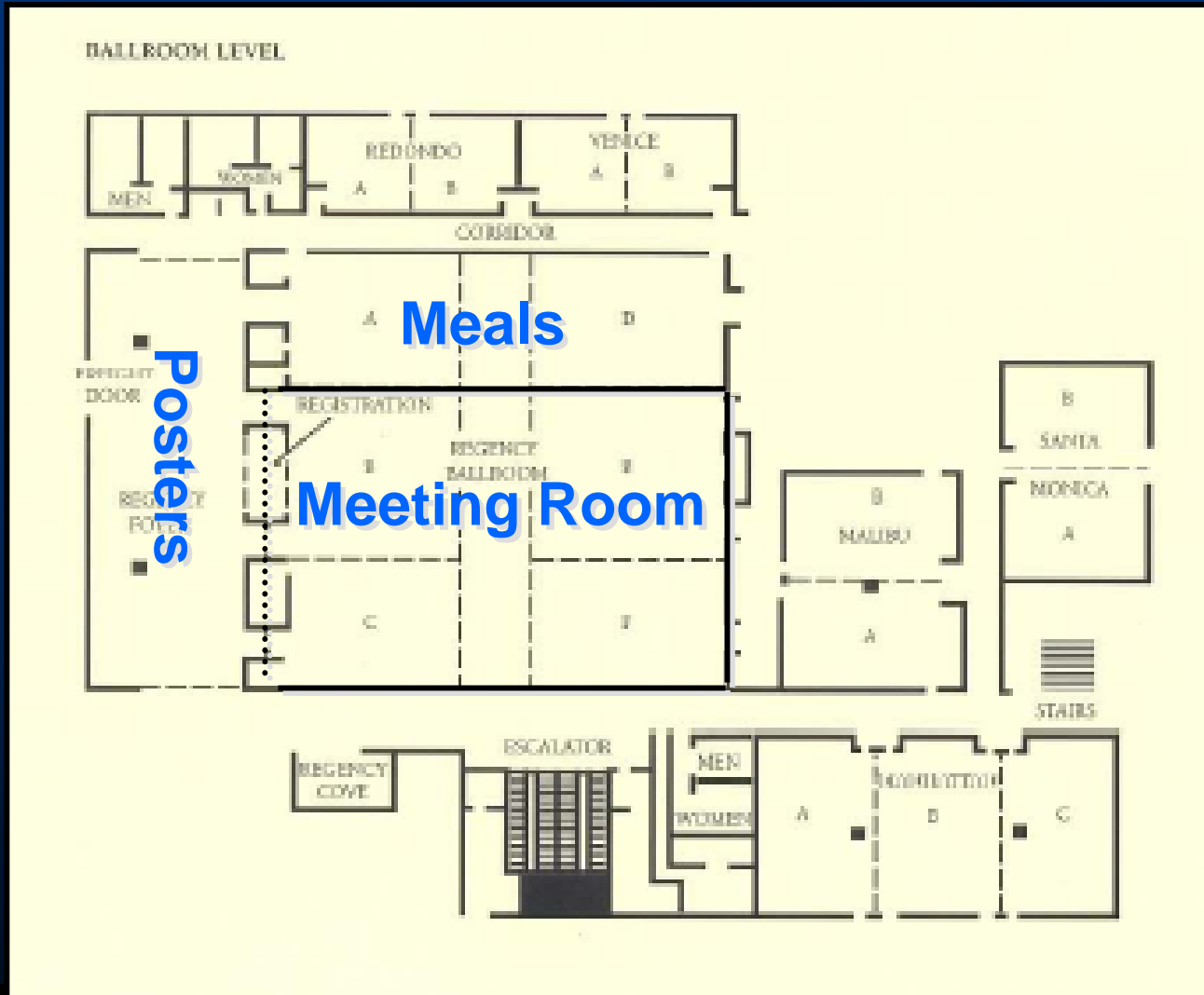
Info

- **Non-confidential Meeting Disclosure**
- **Hotel Logistics**
- **Critical Issues List**
- **Efforts since July 11th, 2003**
- **Stoplight Chart**
- **Agenda**
- **Acknowledgements**

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Hotel Logistics



Immersion Litho Top Ten Critical Issues – July 2003

1. Defect formation, control, and characterization – e.g., droplet in wrong place, topography, or entrainment from jets – new defect types
2. Hyper NA complexity and reticle polarization constraints including impact on: field size (lens complexity), reduction ratio, RET, and simulation tools.
3. Robust CaF₂ protective layer for bottom element, including laser durability, contamination/erosion susceptibility
4. Specification and preparation of water, including: absorption control, surface tension & wettability, and ESD
5. Influence of fluid on resist, resulting in altered process properties (e.g., swelling).
6. Timing versus infrastructure versus competing technologies, extensibility
7. Chemical contamination of fluid by resist which impacts imaging through altered fluid optical properties on time scale of exposure
8. Edge Die Exposure
9. Thermal management of fluid
10. Experimental data (early tool access)

SEMATECH Activities

- Efforts in conjunction with other researchers to develop further understanding of issues.
- Presentations in the Workshop will highlight these efforts
- Two issues needed to have quick identification/resolution
 - Hyper-NA
 - What is “water”

Hyper-NA

- SEMATECH organized a Hyper-NA meeting
 - September 4th, 2003
 - Held in Austin, Texas USA
 - 22 experts attended
 - Addressed issues in
 - Simulators
 - Masks
 - Tools
 - Systems
 - Developed list of critical issues

Hyper-NA Critical Issues Prioritized List

1. New features desirable in simulators
2. Imaging strategies with polarization
3. Experimental validation of simulators
4. Mask Polarization impact/effects including
5. Single versus multiple exposure
6. Magnification and Field Size
7. Benchmarking of simulators (public info)
8. Availability of data on commercial masks
9. Phase performance of PSM
10. Tool Characterizations

Definition of "water"

- Concern of the requirement to define the properties of what is acceptable "water"
- Several telecons on the issue
- Result
 - Capabilities exist to determine characteristics of any type "water"
 - Each tool manufacturer will supply liquid that meets the specifications they have designed into the system
 - Definition of "water" is not an issue and standards do not need to be developed.

Agenda

Welcome and Overview	Walt Trybula (ISMT)	30	8:00 AM	8:30 AM
Resist introduction	Will Conley (ISMT/Motorola)	20	8:30 AM	8:50 AM
Leaching	Bob LeSuer (UT)	20	8:50 AM	9:10 AM
Scintillation	Chris Taylor (UT)	20	9:10 AM	9:30 AM
NM efforts including hyper-NA	Alex Raub (U NM)	20	9:30 AM	9:50 AM
RIT μ stepper efforts	Bruce Smith (RIT)	20	9:50 AM	10:10 AM
New Fluids / Conclusion	Will Conley (ISMT/Motorola)	20	10:10 AM	10:30 AM
Questions		10	10:30 AM	10:40 AM
Break		30	10:40 AM	11:10 AM
Fluids Introduction	Andrew Grenville (ISMT/Intel)	10	11:10 AM	11:20 AM
Topology/filling/lens loading/index impact	Greg Nellis, Alex Wei (U Wisc)	45	11:20 AM	12:05 PM
Bubble creation/reduction	Satish Kandlikar (RIT)	10	12:05 PM	12:15 PM
Lunch		60	12:15 PM	1:15 PM

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Water for Immersion Lithography	Mike Switkes (MIT/LL)	45	1:15 PM	2:00 PM
Fluid Refractive Index Metrology	John Burnett (NIST)	15	2:00 PM	2:15 PM
Conclusion	Andrew Grenville (ISMT/Intel)	10	2:15 PM	2:25 PM
Questions		10	2:25 PM	2:35 PM
Break		30	2:35 PM	3:05 PM
Exposure Tool Company Report - Nikon	Soichi Owa	20	3:05 PM	3:25 PM
Exposure Tool Company Report - Canon	Akiyoshi Suzuki	20	3:25 PM	3:45 PM
Exposure Tool Company Report - ASML	Bill Arnold	20	3:45 PM	4:05 PM
Questions		10	4:05 PM	4:15 PM
Prospects for 157-nm Liquid Immersion	Mordy Rothschild (MIT/LL)	15	4:15 PM	4:30 PM
Summary	Walt Trybula (ISMT)	30	4:30 PM	5:00 PM

Acknowledgements

- Mordy Rothschild (MIT/LL), Andrew Grenville (ISMT/Intel), Will Conley (ISMT/Motorola)
- Support Staff
 - Judy Behr (Presentation & Posters organization and CD creation)
 - Beth Kells (Registration)
 - Connie Reed (Registration)
 - Darlyne Harlan (Meeting Planning/Logistics)
 - Mario Gonzalez (A/V)
- All the researchers who have worked on the critical issues and are identified in the presentations.