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Materials characterisation excellence through tool automation

Achieve highest performance with minimal effort using automated alignments

Alice Scarpellini

Applications Development Scientist

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The world leader in serving science



Automation driving excellence

Not automation for automations sake..... automation driving better science



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Overview

- Introduction
- Why automated and predictive alignments are so important
- Automation in floor model SEMs; Flash[™] and SmartAlign[™]
- Automation in desktop SEMs;
- Automation in TEMs; Align Genie, AutoSTEM, OptiSTEM and OptiMONO



Introduction

Since their early development, electron microscopes are key to researchers and scientists



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Philips XL series SEM

Why automated and predictive alignments are important





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Automation for floor model SEMs

Less maintenance and alignments means more time for the real work

- Flash[™] Technology
 - ✓ New and automated fine image tuning
 - Always optimized images

- SmartAlign[™] Technology
 - Unattended automated alignments
 - Minimized maintenance



hermo

SEM alignments

Sometimes long and tedious for unexperienced users



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Flash Technology

Easy image optimization, automatic lens align, astigmatism and focus adjustment



- Customized image tuning for a specific area of interest and imaging settings (accelerating voltage and beam current).
- Available with all detectors.
- Customizable Flash settings (steps to run, dwell time and image resolution) to ensure the highestresolution results.

Alignment-free operation for improved productivity

Newly developed approaches for auto-functions for improved productivity



Focus where you need with easy access to autofocus at any location in the field of view.

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 Fast auto-functions for high quality imaging

→Auto focus < 5 s
→Auto stigmator < 5 s

SmartAlign Technology

Minimum effort to keep the system at optimal conditions



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Automation for desktop SEMs



- Auto source tilt
- Auto focus
- Auto stigmation



Automation for desktop SEMs – Auto focus



Bad autofocus

Good autofocus

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Automation for TEMs

Align Genie

✓ Automated TEM and STEM tunings

AutoSTEM

✓ Automated focus/astigmatism correction

- OptiSTEM+
- Automated aberration correction

OptiMONO

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 Optimal energy resolution and optimized monostigmation and focus



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Align Genie

Align Genie aligns the microscope for you so that you can focus on doing experiments.



AutoSTEM

Automated alignment software for the correction of focus and astigmatism in STEM mode.



- Designed to work at STEM magnification up to 1 million
 - Fast and reproducible
 - Best foundation for HRSTEM
 - Extremely useful for beam sensitive materials

OptiSTEM+

Automated, fast and reproducible aberration correction

- Fast: it provides the best correction of 1st and 2nd order aberrations (2-3 min) in the area of interest.
- **Better results**: provide the ultimate STEM resolution.
- **Reliable**: allows to achieve the ultimate resolution of the system in a wide range of acceleration voltages, between 60 and 300 kV.
- No more sample deterioration



OptiMono+

Provides the optimal energy resolution for a certain mono excitation and optimizes mono-stigmation and focus

- Turn on the monochromator
- Excite it by applying both magnetic field and electric field (higher strength of the field applied will give higher energy resolution
- Automatic adjustment of the monochromator focus, stigmator X and Y
- GIF filter focus X and Y adjustment



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Not just a black box



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Conclusions

How our automation solutions are supporting our users.....



• Alignment-free operation guarantee higher efficiency and the possibility to run long workflows overnight or over the weekend.



ACCESSIBILITY

PRODUCTIVITY

- Tools are now available to users of any experience level.
- · Tools are more accessible for remote work.



- · Improved reliability.
- Ready-to-go tools
- · Optimized tools generate reproducible results.