(Color) Calibration update

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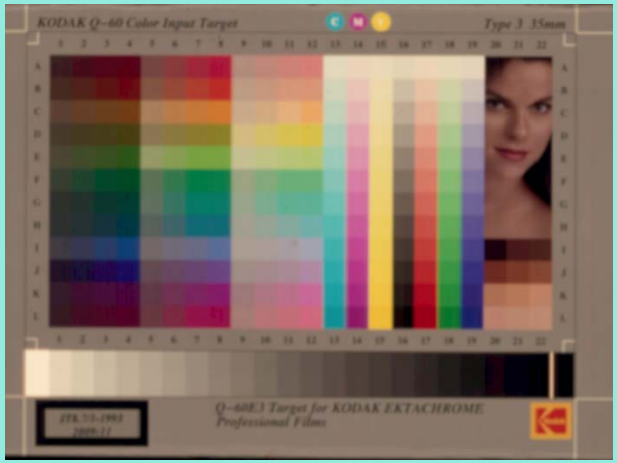
Color calibration in the current Philips scanner



Standarized Color Target

Scanner

Color Profiler

Reference

Residual Error (ΔE)

Correction Matrix

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Results

- Calibration makes scanner colors more consistent
  - Before: mean scanner: 1.2+/-0.7ΔE, worst scanner 3.5ΔE
  - After: mean scanner: 1.8+/-1.0ΔE, worst scanner 4.7ΔE
- Calibration brings scanner colors closer to the "ground truth"
  - Before: mean scanner: 10.1+/-0.4ΔE
  - After: mean scanner: 3.5+/-0.3ΔE
- Color targets (phantoms) can be made in a reproducible fashion
  - Mean error between color phantoms: 0.6+/-0.3ΔE
  - Resolution and contrast and noise influence color perception (and overall image quality perception) even if they don't quantitatively influence color.
- Best "calibration mode" found:
  - Linear correction Matrix works best! (better than non-linear LUT)
  - Because: over-fitting and local-optimization (film ≠ stained tissue)

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Exploratory "Phantom" work

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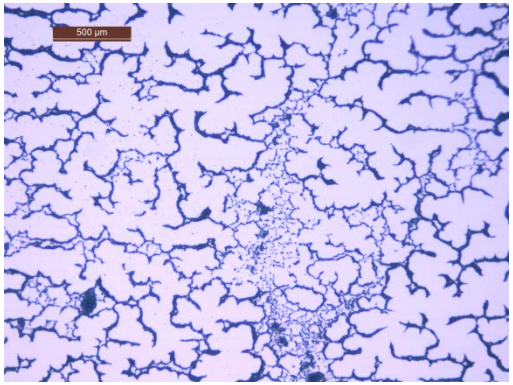
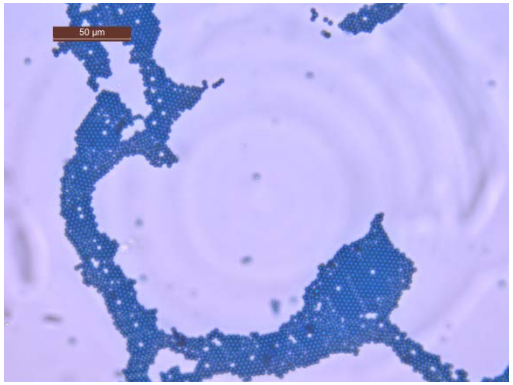
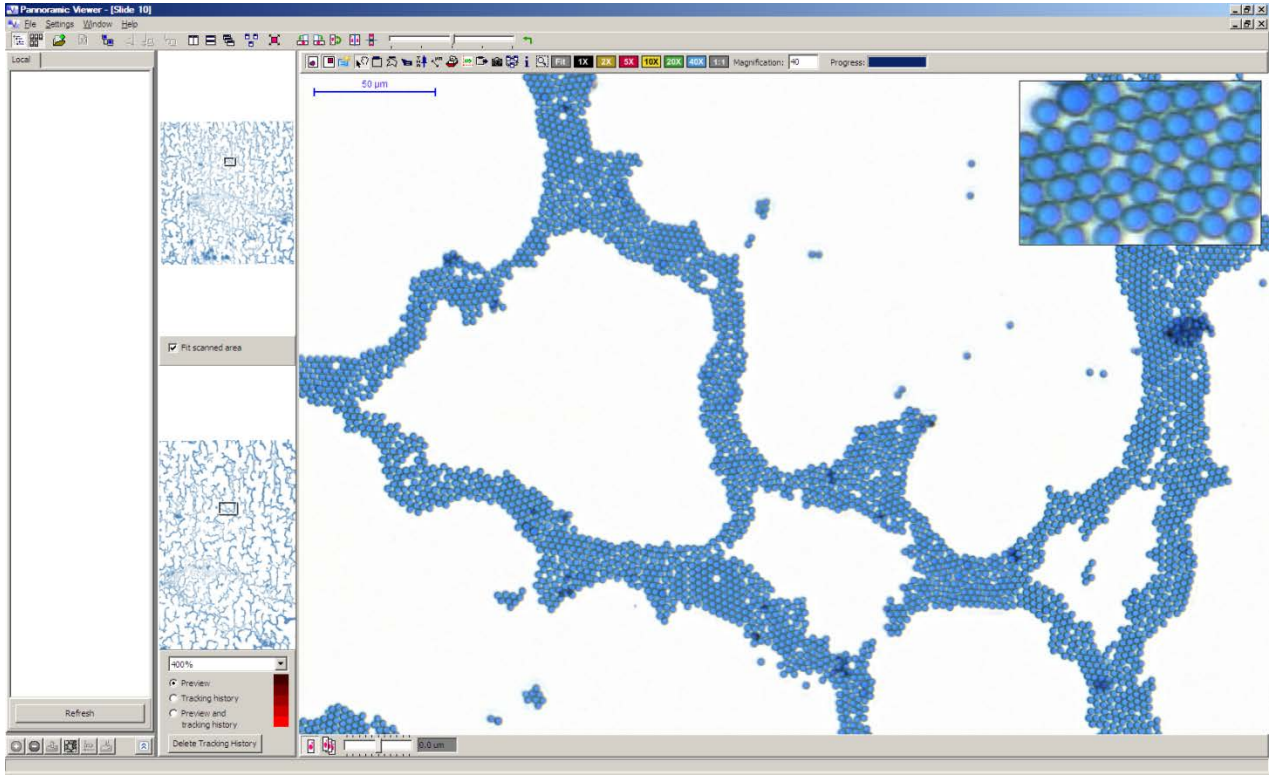
Stained beads

- Tissue-like patterns, monolayers of beads, tunable bead size (1um to 10um)
- Individual beads can be resolved







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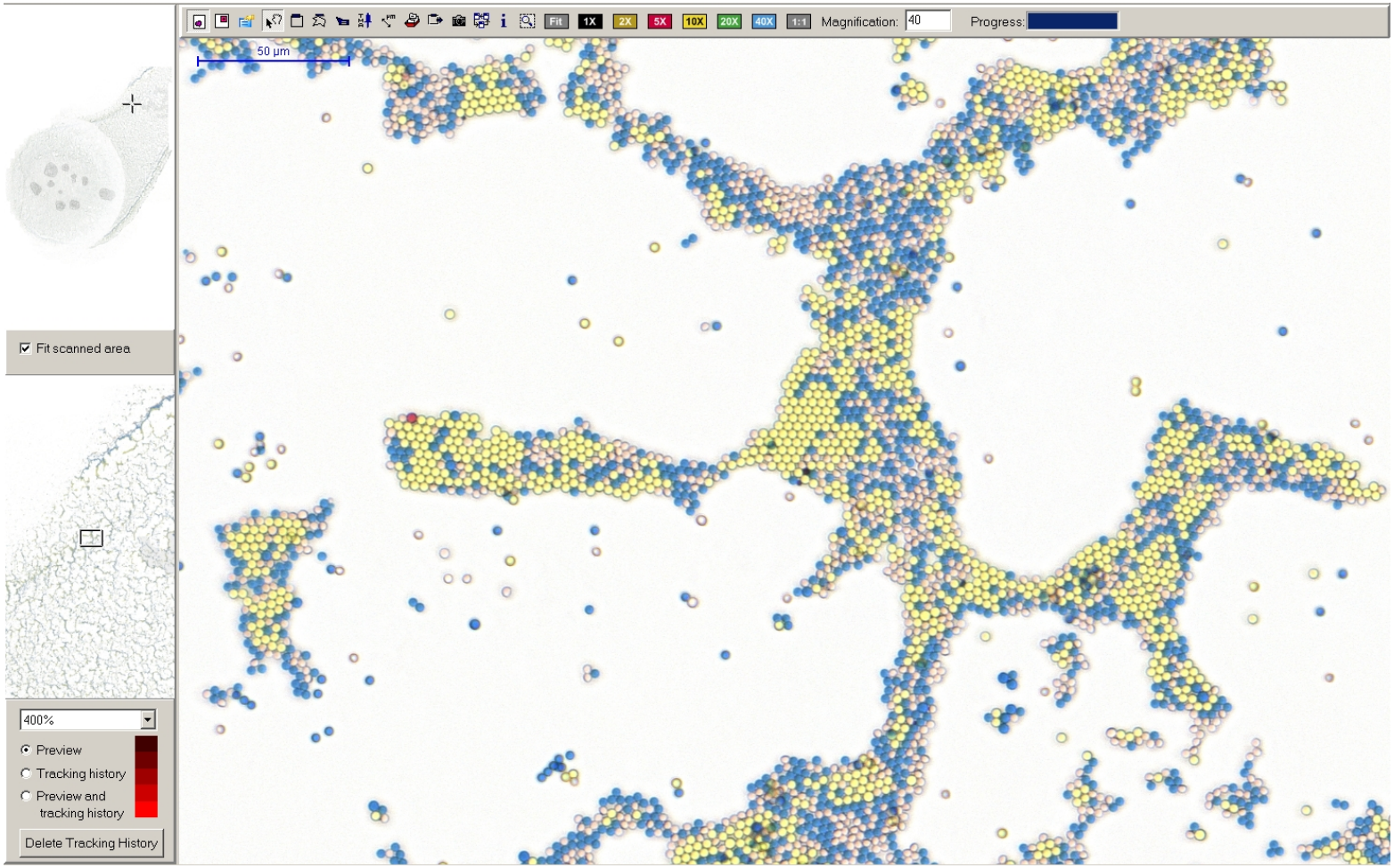
Mix multiple colors



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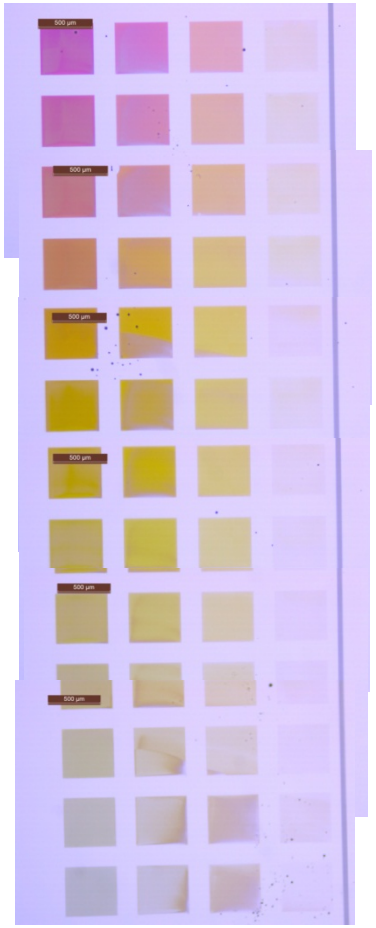
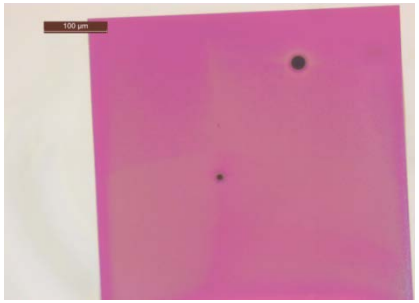
Plasmonics, a possible way towards stable, and well defined color phantoms

- Well defined colors
- Transmission &
- Reflection

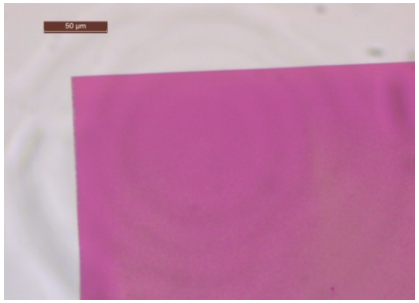


4x

10x



20x



40x

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