

## QSP (Quasi-spectral tool)

is a software tool for extraction of transparency (quasi)spectra of an image of a microobject observed by a bright-field light microscope equipped with a rgb camera.

If needed, for more information ask Kirill Lonhus (lonhus@frov.jcu.cz).

### QSP Command line application ver. 0.1.1

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I. The easiest way to calculate the image spectrum:
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1/ Put the camera and light spectrum into the same directory as input image and name it "camera.txt" or "light.txt" respectively.

2/ Run: `qsp.exe -i /path_to_image/myimage.png`

The quasi-spectrum will be automatically saved to `/path_to_image/myimage_spectrum.hsp`. The \*.hsp file is based on HDF5 format.

Set up the paths manually:

a/ camera spectrum: `-c /path_to_camera_spectrum/mycamera.txt`

b/ light spectrum: `-l /path_to_light_spectrum/mylight.txt`

c/ quasi-spectrum file: `-q /path_to_quasispectrum/myspectrum.hsp`

Export to Matlab

```
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add parameter: -M yes
```

The spectrum will be exported to `image_spectrum.mat` in the same directory as the quasi-spectrum (i.e. `/path_to_quasispectrum/image_spectrum.mat`).

Setup the Matlab filename manually: `-F /path_to_matlabfile/myspectrum.mat`

The MAT file contains three arrays:

- 'waves' ... wavelengths

- 'source' ... multiplied and processed camera\*light spectras.

- 'spectrum' ... the calculated quasi-spectrum of the image

Export wavelengths images:

```
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add parameter: -e yes
```

The images will be exported to the `/path_to_quasispectrum/spec_img/`.

Setup the export path manually: `-s /path_to_export_dir/`

Example 1:

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Calculate quasi-spectrum of the image /mydir/image.tif. The camera and light spectrum are placed in the same directory as the input image.

Export the quasi-spectrum to MAT file /myspectras/spectrum.mat

```
qsp -i /mydir/image.tif -M yes -F /myspectras/spectrum.mat
```

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II. Exporting from the existing quasi-spectrum file (*.hsp)
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Just do not pass the -i parameter but the -q param only.

Example 1:

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Export wavelengths images from /mydir/quasispectrum.hsp to /myexportdir

```
qsp -q /mydir/quasispectrum.hsp -e yes -s /myexportdir
```

Example 2:

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Export quasi-spectrum /mydir/quasispectrum.hsp to MAT file /myoutput/spectrum.mat

```
qsp -q /mydir/quasispectrum.hsp -M yes -F /myoutput/spectrum.mat
```

Example 3:

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Export wavelengths images and MAT file to the same directory as quasi-spectrum /mydir/quasispectrum.hsp

```
qsp -q /mydir/quasispectrum.hsp -e yes -M yes
```

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III. Other parameters
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```

To show the complete help run the qsp.exe without params or "qsp.exe -h".

-b <BayerGrid> ... The Bayer's grid of the input image (if it is a RAW image). For RGB images the -b parameter is ignored.

-t <MaxTrans> ... the maximum transparency. See the create\_exp.m, line 38.

-a <SaturatedAmount> ... Default is 0.01 (1%). The amount of low and high pixels to be saturated (see Matlab's function imadjust()). It is used for the input image preprocessing.

Other parameters should be clear from the help provided by the program.