



Fúze hybridních modalit 2x2 – technická realizace a limity

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Hybridní modality

Spojení funkční a anatomické zobrazovací soustavy v jeden celek

- SPECT/(lowdose)CT
- PET/CT
- PET/MRI



Fúze hybridních modalit

SPECT → CT

- via lowdose CT → CT

PET → MRI

- via CT → MRI

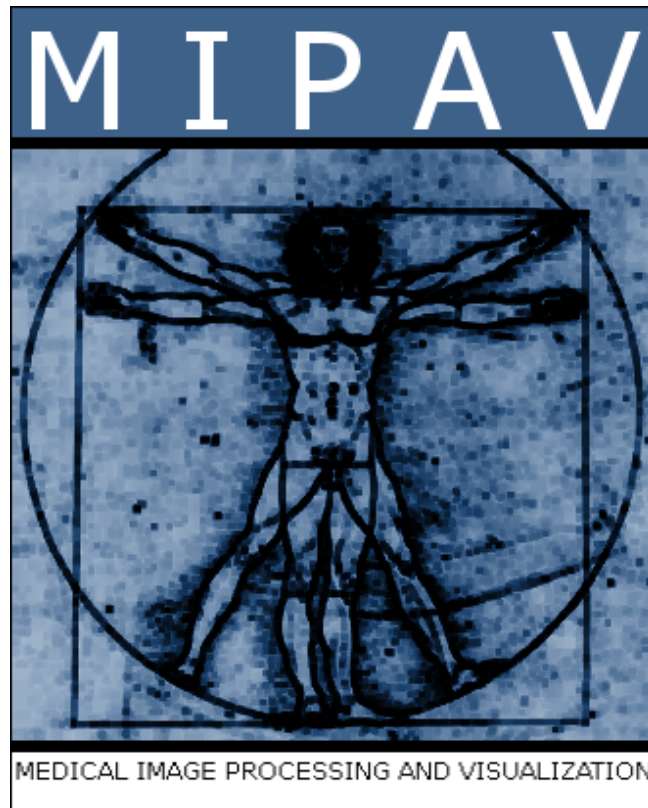
SPECT → PET

- via lowdose CT → CT



Nástroje

Firemní vs. volně dostupné





SPECT/CT → PET/CT

Via lowdose CT → CT

- Oprava chyb v orientaci a rozměrech obrazů
- Dílčí fúze SPECT/CT
- Dílčí fúze PET/CT
- Nalezení vhodné oblasti zájmu pro registraci
lowdose CT → CT
- Registrace lowdose CT → CT
- Aplikace stejné transformace na SPECT



SPECT/CT → PET/CT

Oprava chyb

▼ Volume Information

Image Dimensions:

Image Spacing:

Image Origin:

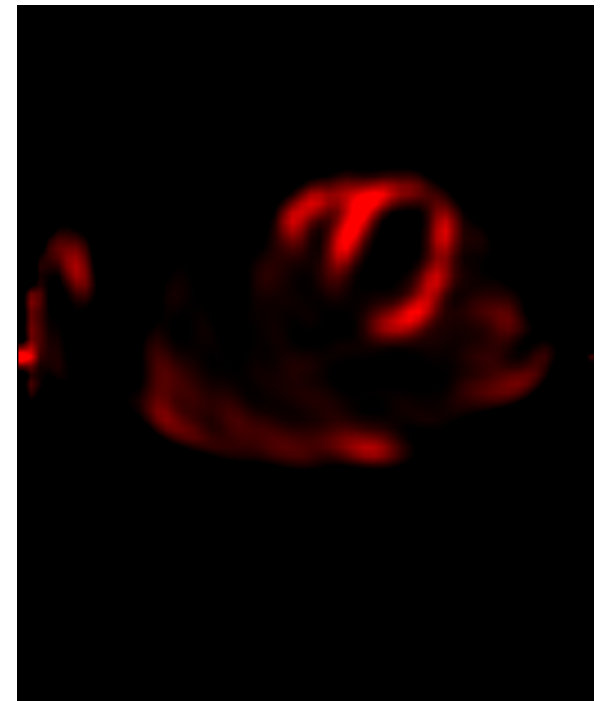
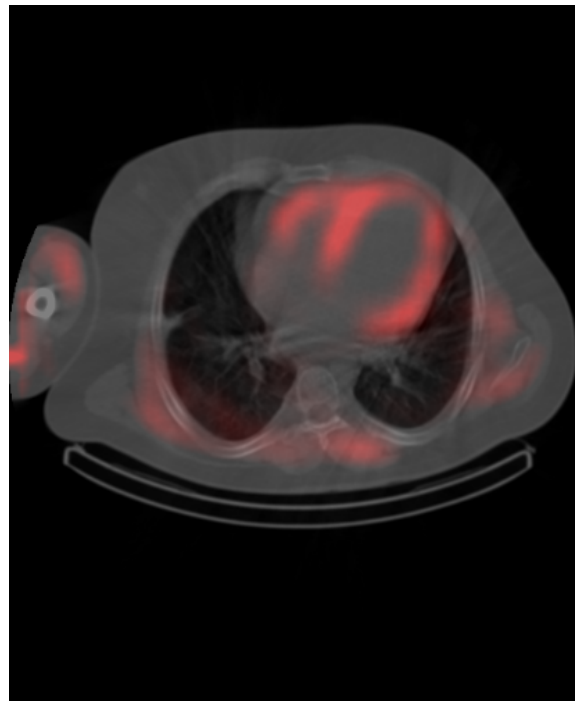
IJK to RAS Direction Matrix:

Center Volume



SPECT/CT → PET/CT

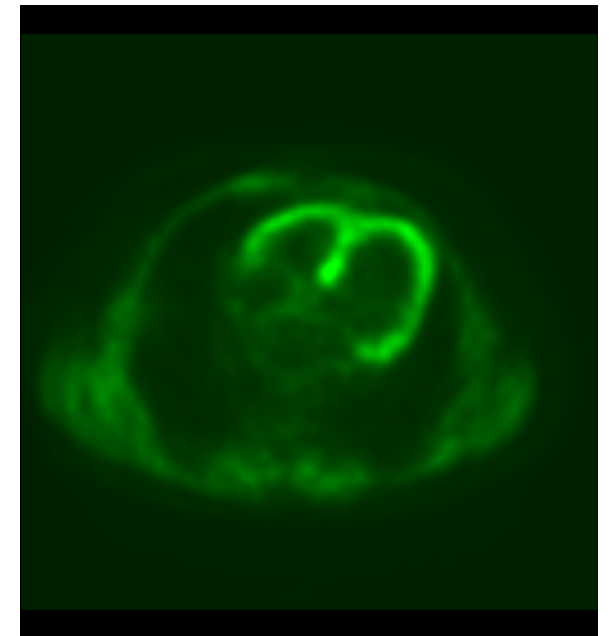
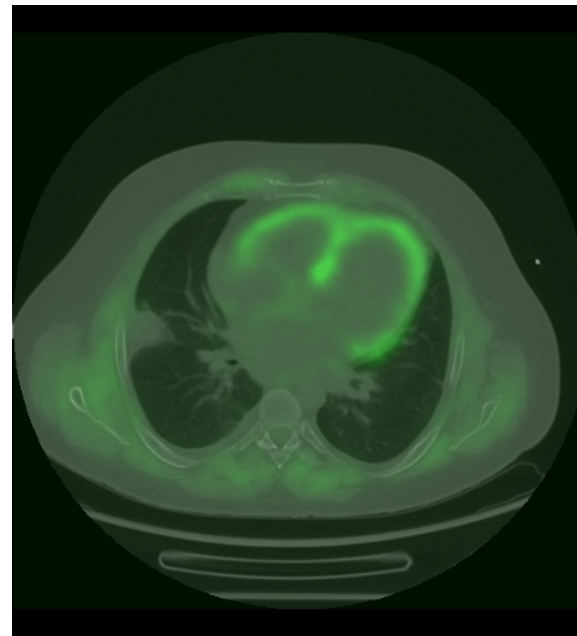
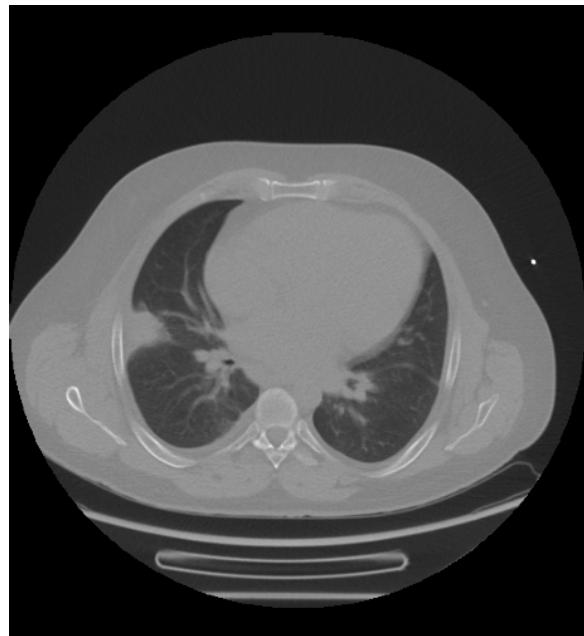
Dílčí fúze SPECT / lowdose CT





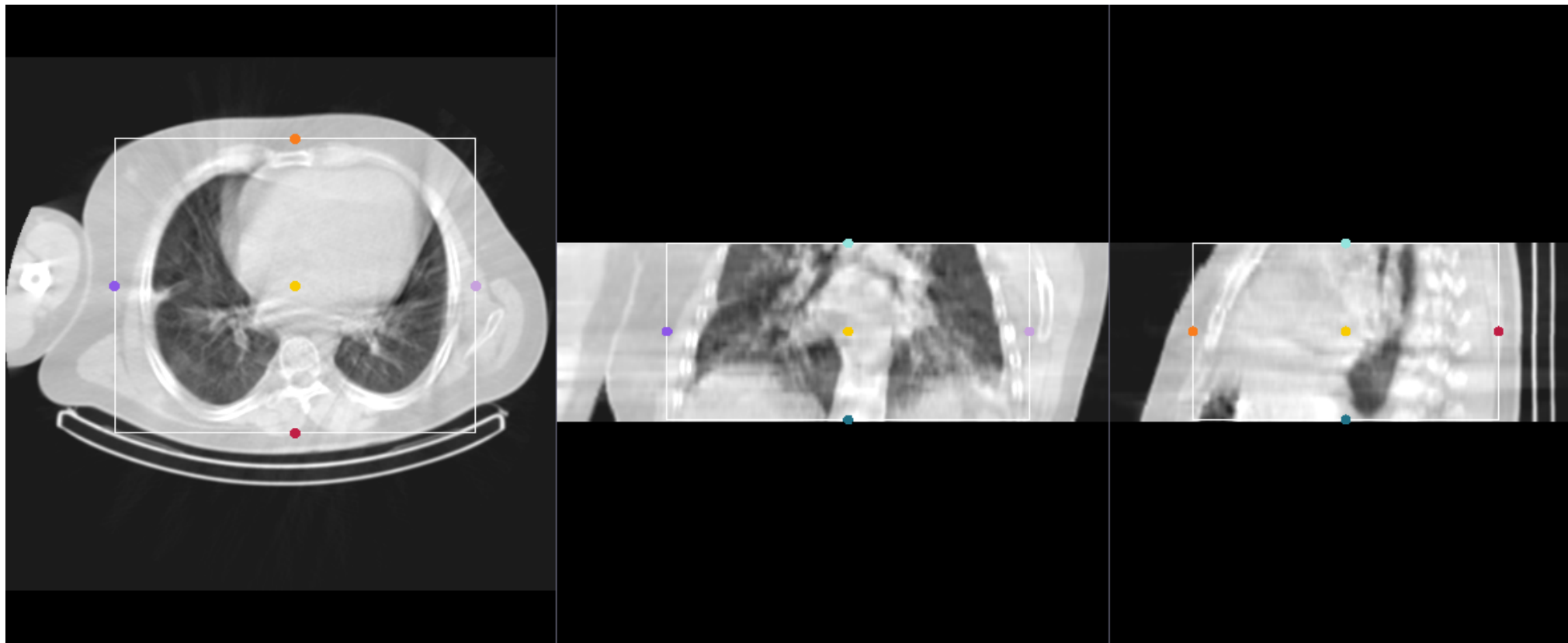
SPECT/CT → PET/CT

Dílčí fúze PET / CT



SPECT/CT → PET/CT

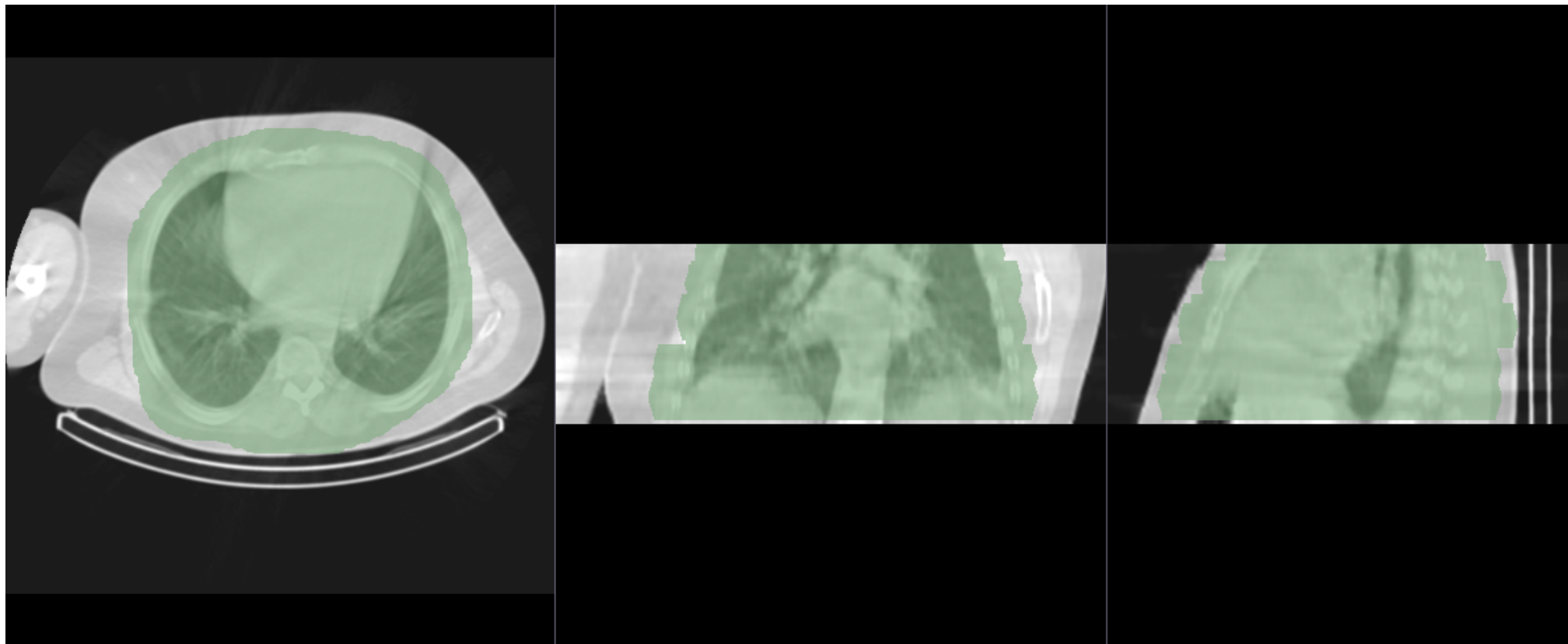
Registrační maska (VOI)





SPECT/CT → PET/CT

Registrační maska (VOI)





SPECT/CT → PET/CT

Registrace

▼ Input Images

Fixed Image Volume

Moving Image Volume

▼ Output Settings (At least one output must be specified.)

Slicer BSpline Transform

Slicer Linear Transform

Output Image Volume

▼ Initialization of registration

Initialization transform

Intitialze Transform Mode off useMomentsAlign
 useCenterOfHeadAlign useGeometryAlign
 useCenterOfROIAlign

▼ Registration Phases (Check one or more, executed in order listed)

Rigid (6 DOF)

Rigid+ Scale(7 DOF)

Rigid+ Scale+Skew(10 DOF)

Affine(12 DOF)

BSpline (>27 DOF)

SyN

Composite (many DOF)

► Main Parameters

▼ Mask Option

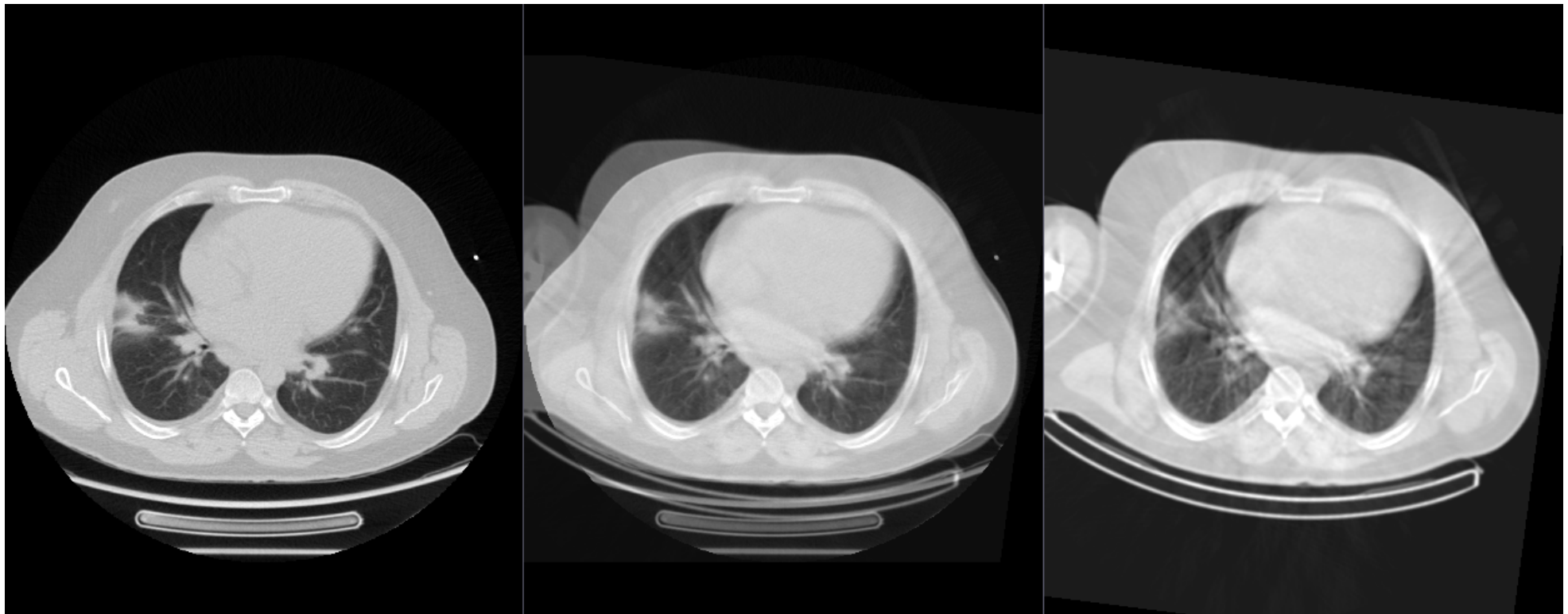
Masking Option NOMASK ROIAUTO ROI

(ROI)Masking input fixed

(ROI)Masking input moving

SPECT/CT → PET/CT

Kontrola registrace





SPECT/CT → PET/CT

Transformace

▼ Apply transform

Transformable:

- ... Default Scene Camera
- ... Default Scene Camera
- ... PET
- ... CT
- ... Flip_SI
- ... F
- ... R
- ... Hawkeye-label
- ... CT-label

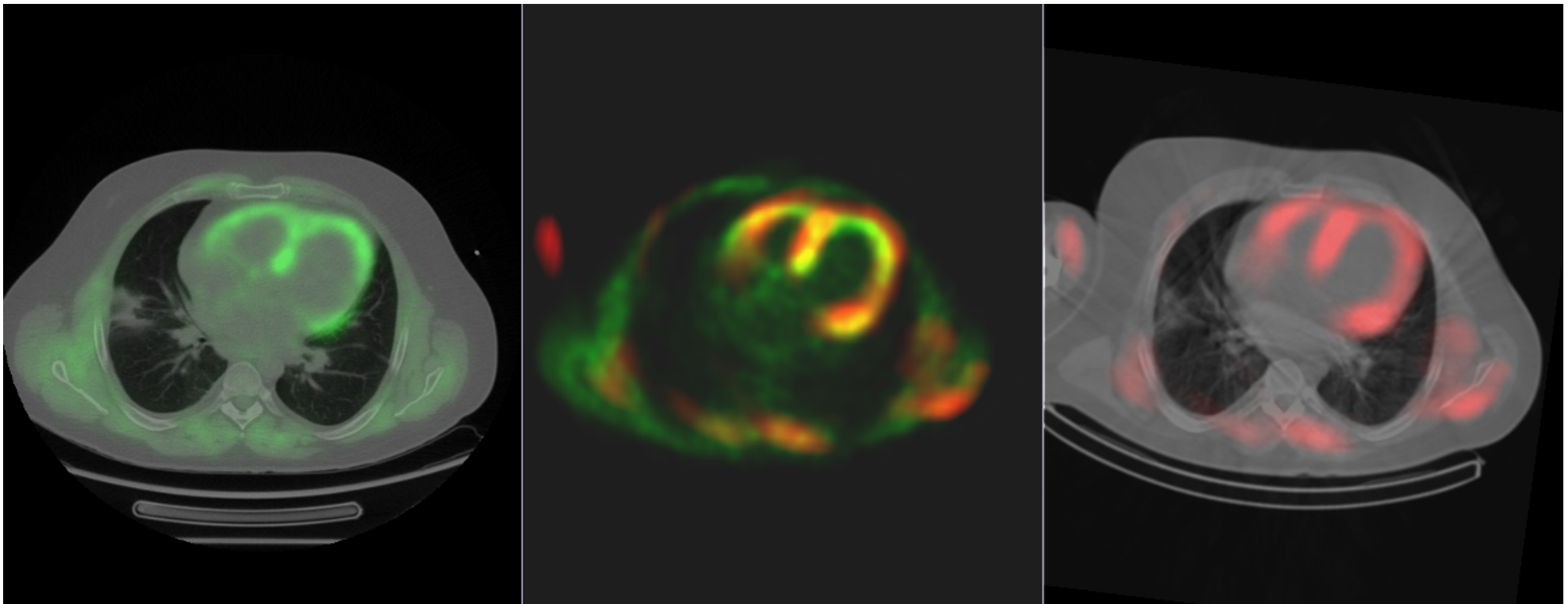
Transformed:

- ... SPECT
- ... Hawkeye



SPECT/CT → PET/CT

Výsledek





Limitace

Softwarová fúze je vždy nepřesná

- Různé skrčení těla, poloha končetin
- Různé fáze nádechu
- Rozdíly mezi přístroji
- Pozor při plánování RT: PET/CT → plan CT

3DSlicer pro RT

