DICOM Correction Proposal

STATUS	~~Letter Ballot~~Draft Final Text
Date of Last Update	2024/~~08~~11/~~24~~02
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Correction Number	CP-2400
Log Summary: Add Mixed Ion Radiation Type and add Ion species information in control points	
Name of Standard	
PS3.3 2024d	
Rationale for Correction:	
During the initial design of the Ion Beam Plan IOD, the main constituents of the committee consisted of some DICOM experts with little ion beam experience and some ion beam therapy experts with little DICOM experience. Apparently lack of knowledge on both sides resulted in confusion about how the radiation type attribute would be used. The intent was that the ion beam plan would support delivery of ion beams for treatment and photon beams for alignment imaging. Different ion species could be selected for different control points. The current standard limits the selection of different ion species only to the beam level instead of at the control point level. This correction removes this restriction by adding a new Radiation Type Defined Term and by adding attributes that allows the ion species to be changed at the control point level as originally intended.	
[Comment. UG Austria: In case of MIXED_ION different ions contribute – shouldn't there be more than one value for Radiation Mass Number, Radiation Atomic Number, and Radiation Charge State? How are these values calculated if there are different ions involved? REJECTED. There is one radiation type per control point, not mixed within a control point, so having these Attributes within the Ion Control Point Sequence Item is sufficient.]	
Correction Wording:	

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In PS 3.3, Section C.8.8.25 RT Ion Beams Module, the following changes are to be made.

Table C.8.8.25-1. RT Ion Beams Module Attributes

Attribute Name	Tag	Type	Description
Ion Beam Sequence	(300A,03A2)	1	Sequence of setup and/or treatment beams for current RT Ion Plan. One or more Items shall be included in this Sequence.
…			
>Radiation Type	(300A,00C6)	1	~~Particle t~~**T**ype of **External** Beam **Radiation**. Defined Terms: PHOTON **X-rays or gamma rays** PROTON **Hydrogen ion** ION **Single non-hydrogen ion species**

			MIXED_ION PROTON and ION combination or ION combination
>Radiation Mass Number	(300A,0302)	1C	Mass number of radiation. Required if Radiation Type (300A,00C6) is ION.
>Radiation Atomic Number	(300A,0304)	1C	Atomic number of radiation. Required if Radiation Type (300A,00C6) is ION.
>Radiation Charge State	(300A,0306)	1C	Charge state of radiation. Required if Radiation Type (300A,00C6) is ION.
…			
>Ion Control Point Sequence	(300A,03A8)	1	Sequence of machine configurations describing Ion treatment beam. The number of Items shall be identical to the value of Number of Control Points (300A,0110). See Section C.8.8.25.7.
…			
>>Radiation Mass Number	**(300A,0302)**	**1C**	**Mass number of radiation. Required if Radiation Type (300A,00C6) is MIXED_ION.**
>>Radiation Atomic Number	**(300A,0304)**	**1C**	**Atomic number of radiation. Required if Radiation Type (300A,00C6) is MIXED_ION.**
>>Radiation Charge State	**(300A,0306)**	**1C**	**Charge state of radiation. Required if Radiation Type (300A,00C6) is MIXED_ION.**

In PS 3.3, Section C.8.8.26 RT Ion Beams Session Record Module, the following changes are to be made.

Table C.8.8.26-1. RT Ion Beams Session Record Module Attributes

Attribute Name	Tag	Type	Description
Treatment Session Ion Beam Sequence	(3008,0021)	1	Sequence of setup and/or treatment beams administered during treatment session. One or more Items shall be included in this Sequence.
…			
>Radiation Type	(300A,00C6)	1	~~Particle t~~Type of **External** Beam **Radiation**. Defined Terms: PHOTON **X-rays or gamma rays** PROTON **Hydrogen ion** ION **Single non-hydrogen ion species** **MIXED_ION PROTON and ION combination or ION combination.**
>Radiation Mass Number	(300A,0302)	1C	Mass number of radiation. Required if Radiation Type (300A,00C6) is ION.
>Radiation Atomic Number	(300A,0304)	1C	Atomic number of radiation. Required if Radiation Type (300A,00C6) is ION.
>Radiation Charge State	(300A,0306)	1C	Charge state of radiation. Required if Radiation Type (300A,00C6) is ION.
…			
>Ion Control Point Delivery Sequence	(3008,0041)	1	Sequence of beam control points for current ion treatment beam. One or more Items shall be included in this Sequence. The number of Items shall be identical to the value of Number of Control Points (300A,0110). See Section C.8.8.21.1.
…			
>>Radiation Mass Number	**(300A,0302)**	**1C**	**Mass number of radiation. Required if Radiation Type (300A,00C6) is MIXED_ION.**
>>Radiation Atomic Number	**(300A,0304)**	**1C**	**Atomic number of radiation. Required if Radiation Type (300A,00C6) is MIXED_ION.**
>>Radiation Charge State	**(300A,0306)**	**1C**	**Charge state of radiation. Required if Radiation Type (300A,00C6) is MIXED_ION.**