**GLDS Radiation Characterization**

**Project Type**

* Ground
* Spaceflight
* Atmospheric Flight

**Factors**

Delete:

* Absorbed Radiation Dose
* Cosmic radiation
* Dose
* Fractionated Dose
* Ionzing Radiation (sic)
* Irradiated
* irradiation
* Radiation
* Radiation Distance
* Radiation Dose
* radiation type
* Radiation, Ionzing (sic)
* ionizing radiation

Add:

* ionizing radiation (particle)
* ionizing radiation (photon)

**Characteristics**

* Radiation Source (accelerator, radioactive source type, vehicle)
* Radiation Type
* ion
* neutron
* x-ray
* gamma
* mixed space radiation (LEO)
* mixed space radiation (beyond LEO)
* mixed radiation (balloon)
* accelerator mixed field

**Parameters**

* Absorbed Radiation Dose
* Absorbed Radiation Dose Rate
* Particle Charge
* Particle Energy
* Particle Linear Energy Transfer
* Radiation Exposure Duration

**Example1: Space Shuttle Payload**

GLDS-11

Project Type – spaceflight

Organism – Salmonella enterica

Factors – ionizing radiation

Characteristic: Radiation Type – mixed space radiation (LEO)

Parameter: Absorbed Radiation Dose Rate

Parameter: Radiation Exposure Duration

Available “Export Columns” under “SAMPLES” are *Project Type, Factor, Organism, Source Name, Sample Name, Comment: Sample\_characteristics, Characteristic: Radiation Type, Parameter: Absorbed Radiation Dose, Parameter: Radiation Exposure Duration, Comment: Sample\_description, Comment: Sample\_source\_name, Protocol REF* (??))

Since in this case the user presumably already knows the unique values of *Project Type, Factor and Organism*, he or she could just check boxes: *Sample Name, Characteristic: Radiation Type, Parameter: Absorbed Radiation Dose, Parameter: Radiation Exposure Duration*

Export data would look something like:

|  |  |  |  |
| --- | --- | --- | --- |
| Sample Name | Characteristic: Radiation Type | Parameter: Radiation Exposure Duration (days) | Parameter: Absorbed Radiation Dose (mGy) |
| GSM341674 extract 1 | Mixed space radiation (LEO) | 1 | 0.23 |
| GSM341675 extract 1 | Mixed space radiation (LEO) | 1 | 0.23 |
| GSM341670 extract 1 | Mixed space radiation (LEO) | 1 | 0.23 |
| GSM341671 extract 1 | Mixed space radiation (LEO) | 1 | 0.23 |
| **.**  **.**  **.** |  |  |  |

**Example 2: ISS Payload**

(No radiation data in GLDS yet)

Same as Example 1.

**Example 3: Satellite (BION-M1) Payload**

GLDS-111

Project Type – spaceflight

Organism – Mus musculus

Factors – ionizing radiation

Characteristic: Radiation Type – mixed space radiation (LEO)

Parameter: Absorbed Radiation Dose

Parameter: Radiation Exposure Duration

Same export data (check boxes) as Example 1. The only available radiation-related columns would be *Characteristic: Radiation Type, Parameter: Absorbed Radiation Dose, Parameter: Radiation Exposure Duration*. *i.e.* delete all the detailed parameter values (dose as a function of detector, LET, GCR vs. ORB). These are more info than the average experimenter would need and should be kept in the Environmental Data section.

**Example 4: Accelerator Data**

GLDS-149

Project Type – ground

Organism – Homo sapiens

Factors – Ionizing Radiation (ion)

Characteristic: Radiation Type

Characteristic: Radiation Source

Parameter: Particle Charge

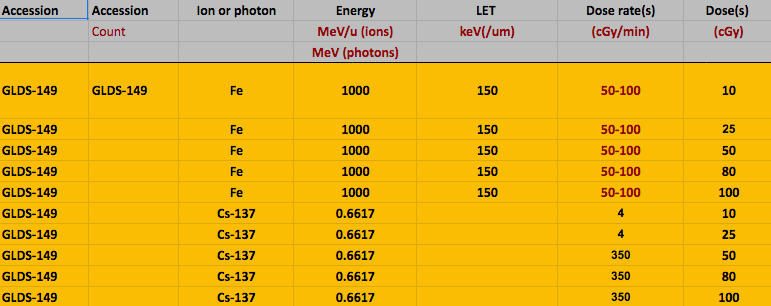
Parameter: Particle Energy

Parameter: Particle Linear Energy Transfer

Parameter: Absorbed Radiation Dose

Parameter: Absorbed Radiation Dose Rate

GLDS-149 exposed samples to accelerated iron ions at the NASA Space Radiation Laboratory and to high and low dose rate gamma radiation:



Selecting search filters *Project Type-ground*, *Organism-Homo sapiens*, and *Factor-ionizing radiation (ion)* would yield GLDS-149 (and perhaps others). Selecting GLDS-149, clicking on *Samples* and selecting the boxes for *Characteristic:Radiation* *Type* and the first four *Parameters* above would yield something like:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sample Name | Characteristic: Radiation Type | Parameter: Particle Charge | Parameter: Particle Energy (MeV/u) | Parameter: Particle LET (keV/m) | Parameter: Absorbed Radiation Dose (cGy) |
| Sample\_Fe\_1 | ion | 26 | 1000 | 150 | 10 |
| Sample\_Fe\_2 | ion | 26 | 1000 | 150 | 10 |
| . | . | . | . | . | . |
| Sample\_Fe\_10 | ion | 26 | 1000 | 150 | 10 |
| Sample\_Fe\_11 | ion | 26 | 1000 | 150 | 25 |
| Sample\_Fe\_12 | ion | 26 | 1000 | 150 | 25 |
| . | . | . | . | . | . |
| Sample\_Fe\_20 | ion | 26 | 1000 | 150 | 25 |
| Sample\_Fe\_21 | ion | 26 | 1000 | 150 | 50 |
| Sample\_Fe\_22 | ion | 26 | 1000 | 150 | 50 |
| . | . | . | . | . | . |
| Sample\_Fe\_30 | ion | 26 | 1000 | 150 | 50 |
| Sample\_Fe\_31 | ion | 26 | 1000 | 150 | 80 |
| Sample\_Fe\_32 | ion | 26 | 1000 | 150 | 80 |
| . | . | . | . | . | . |
| Sample\_Fe\_40 | ion | 26 | 1000 | 150 | 80 |
| Sample\_Fe\_41 | ion | 26 | 1000 | 150 | 100 |
| Sample\_Fe\_42 | ion | 26 | 1000 | 150 | 100 |
| . | . | . | . | . | . |
| Sample\_Fe\_50 | ion | 26 | 1000 | 150 | 100 |

(Here the Sample names are arbitrary and I’m arbitrarily assuming, for the sake of this example, 10 exposures at each dose.)

A similar search but on the Factor *Ionizing Radiation (photon)* and with checked boxes, *Characteristic: Radiation Type*, *Characteristic: Radiation Source*, *Parameter: Absorbed Radiation Dose, Parameter: Absorbed Radiation Dose Rate* would yield:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample Name | Characteristic: Radiation Type | Characteristic: Radiation Source | Parameter: Absorbed Radiation Dose (cGy/min) | Parameter: Absorbed Radiation Dose (cGy) |
| Sample\_g\_1 | gamma | Cs-137 | 4 | 10 |
| Sample\_g\_2 | gamma | Cs-137 | 4 | 10 |
| . | . | . | . | . |
| Sample\_g\_10 | gamma | Cs-137 | 4 | 10 |
| Sample\_g\_11 | gamma | Cs-137 | 4 | 25 |
| Sample\_g\_12 | gamma | Cs-137 | 4 | 25 |
| . | . | . | . | . |
| Sample\_g\_20 | gamma | Cs-137 | 4 | 25 |
| Sample\_g\_21 | gamma | Cs-137 | 350 | 50 |
| Sample\_g\_22 | gamma | Cs-137 | 350 | 50 |
| . | . | . | . | . |
| Sample\_g\_30 | gamma | Cs-137 | 350 | 50 |
| Sample\_g\_31 | gamma | Cs-137 | 350 | 80 |
| Sample\_g\_32 | gamma | Cs-137 | 350 | 80 |
| . | . | . | . | . |
| Sample\_g\_40 | gamma | Cs-137 | 350 | 80 |
| Sample\_g\_41 | gamma | Cs-137 | 350 | 100 |
| Sample\_g\_42 | gamma | Cs-137 | 350 | 100 |
| . | . | . | . | . |
| Sample\_g\_50 | gamma | Cs-137 | 350 | 100 |